A WINDOW OPEN ON THE WORLD

The UNESCO Courier

APRIL 1962 (15TH YEAR)

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UNESCO ARCHIVES

SPECIAL REPORT

TWO FACES OF WORLD HEALTH

STUDENT MIGRATIONS

Rooftop view of the Acropolis is an inspiring vista for these young architects working at the Institute of Technology in Athens, whose students include twenty-three Pakistanis who will later help to plan their country's new capital. Student exchange helps promote better understanding between countries. This year, 115,000 study fellowships are available.
(See p. 29)

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APRIL 1962
15TH YEAR

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PUBLISHED IN EIGHT EDITIONS

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WHO

COVER PHOTO

"An apple a day keeps the doctor away" is an old but still valid adage, as this Paraguayan girl is learning in school. Lessons on the right foods to eat are given during a campaign against malnutrition, itself part of a wider Latin American movement waged by economists, doctors and educators against the diseases of hunger. (See page 8)

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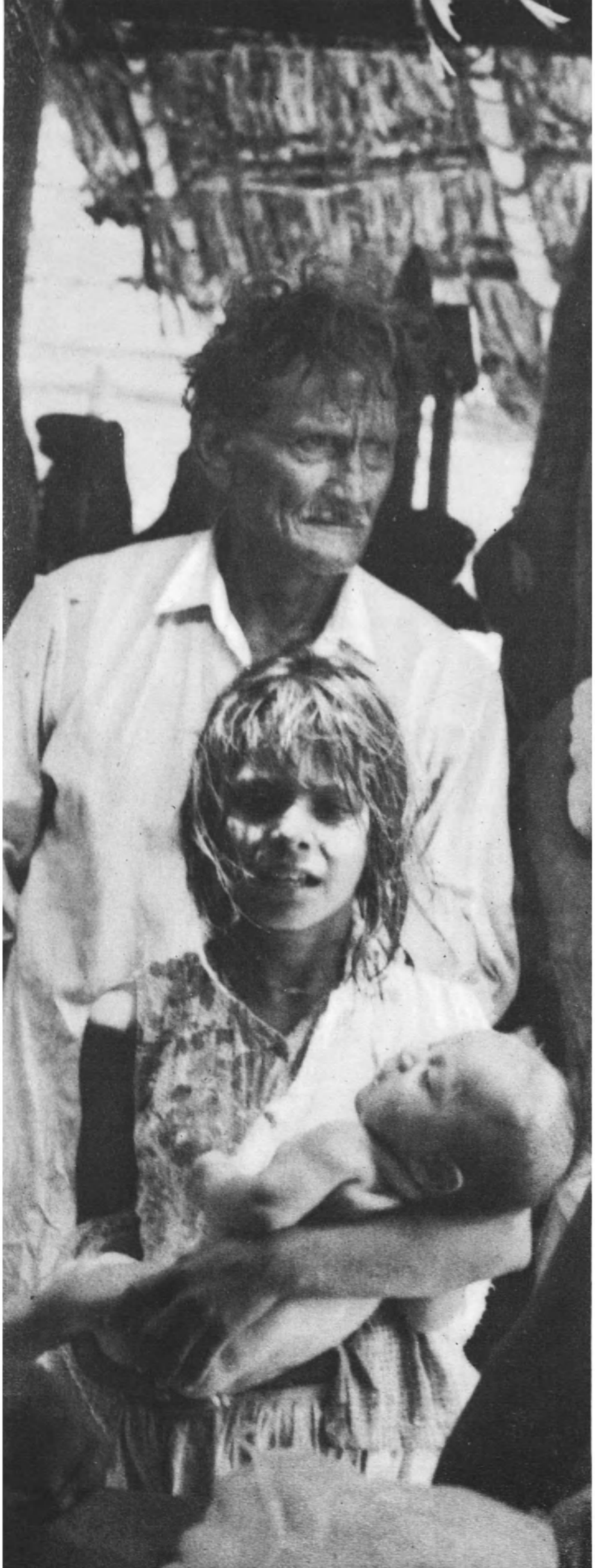


WHO - Paul Almasy

IN A MAKESHIFT DISPENSARY vaccination against smallpox is given in a village of Latin America. Here, three generations are being immunised against this disease which still breaks out in epidemic proportions in some under-developed countries. Systematic vaccination campaigns carried out in Latin American countries have achieved striking success in recent years.

SPECIAL REPORT

Between twenty-five and thirty million lives could be saved each year if health conditions all over the world were the same as those in the most advanced countries. For The Unesco Courier, Jean Manevy, of the World Health Organization, has made a special inquiry into world health today. His report, published here, is focussed on two basic features of the global health picture: the contagious diseases which are still the greatest cause of death and misery in the less economically developed countries and the "killers of modern times" which afflict the most economically advanced countries.

THE TWO FACES OF WORLD HEALTH

by Jean Manevy

1 The challenge of disease & poverty

If the frightening toll of human lives taken each year by sickness is to be eliminated, the less developed countries must first wipe out contagious disease just as the more developed countries have done over the past 50 or 60 years.

In a recent interview in Geneva, Dr. Albert Sabin, one of the men who conquered polio, pointed out that health conditions in the under-developed countries today are comparable to those which existed in Western countries about 60 years ago. "Let us hope," he said, "that these nations will not wait 60 years to bridge the gap since they can take advantage without waiting of the discoveries and experience acquired elsewhere."

Two examples illustrate this point. In Sweden a century ago the life span of the average person was 41 years; fifty years ago it went up to 52 years; today the average Swede lives to be at least 70. In India fifty years ago the average person could expect to live 23 years; ten years ago average expectancy of life rose to 32 years; today it is 42 years.

The description given by Sir Edwin Chadwick (England's pioneer of public health legislation) of living conditions in England less than a hundred years ago might well have been written for many of the newly developing countries of today:

"In the courts and alleys inhabited by the poor," he wrote, "an entire family, or more than one, living in a single room, was by no means uncommon. Worse still, they had inadequate water for drinking, washing cooking, no sanitation and very often not enough light and air. In the North, the dark satanic mills had sprung up like weeds. Around them lay vast areas of industrial slums, where thousands of people lived in indescribably foul and noisome surroundings, over-worked, under-nourished and racked by disease."

Today deaths from typhoid fever, dysentery, diphtheria, whooping cough and measles are as much as 30 times higher in the under-developed countries as they are elsewhere in the world. The death rate for tuberculosis stands twelve times as high; the infant mortality rate is three to four times higher. Malaria alone strikes down hundreds of millions of persons each year and is responsible for at least half a million deaths.

The fact is that the eradication of contagious diseases now stands as Priority Number One on the urgency list of action required for the 2,500 million human beings who live in the under-developed regions.

Bad health is without a doubt the most serious obstacle to a nation's economic and social development. When disease is rampant production drops dragging down with it salaries, living conditions and food consumption. Inevitably the educational level of the nation suffers a serious blow. Increasingly larger sums of money have to be spent on curative medicine instead of on preventive medicine with the result that the general state of health of an entire country begins to deteriorate and plans for economic development are often virtually paralyzed.

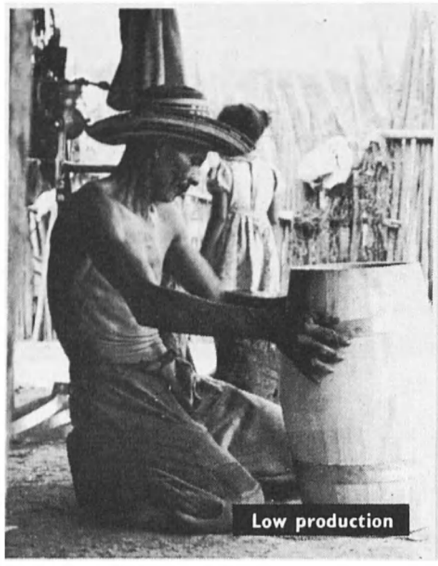
CONT'D ON NEXT PAGE

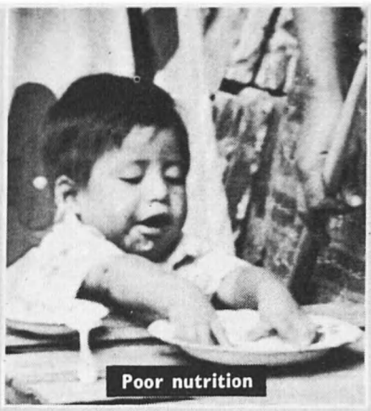
This is the famous "vicious circle of poverty," so often spoken about, in which poverty engenders disease which in turn engenders even greater poverty.

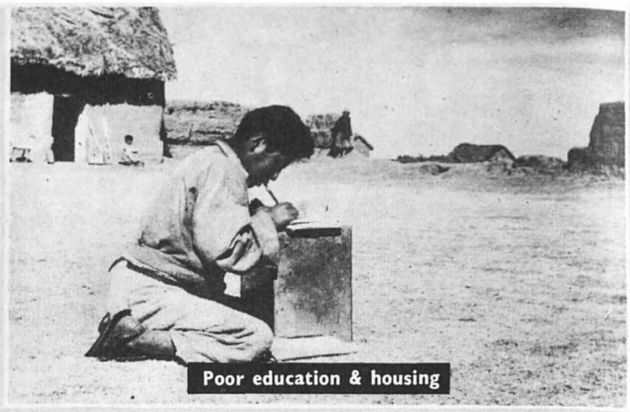
Let us look at this vicious circle as it operates in the case of malaria, a disease affecting 140 countries and territories of the world. Malaria is one of the chief causes of absenteeism from work and of the physical and moral degradation of the individual. It reduces agricultural output, blocks the exploitation of natural resources, and thwarts efforts made by countries towards industrial and commercial expansion.

IN A TRANQUIL SETTING offered by the park of a psychiatric hospital, an old lady goes for her daily walk, hand-in-hand with one of the nursing staff. The economically advanced countries have vanquished many deadly epidemic diseases, but now face the serious problems of cancer, heart diseases, mental health and aging populations.

WHO - Jean Mohr







THE VICIOUS CIRCLE

A victim of malaria is incapacitated for a period of at least two months out of every year. During this period he must be cared for and this often means that someone from his family or amongst his friends must give up his or her own work to do so.

Since the disease usually strikes during the harvest season a malaria-stricken farmer finds himself incapable of gathering in his crop of rice or maize. Furthermore malaria saps a person's very will to work and undermines his mental and physical energies. Unable to plough and sow his fields the farmer finds his next year's crops jeopardized.

But this is only part of the malaria story in the vicious circle of poverty. Malaria is also a killer. Especially when it strikes children. It is responsible for up to 15 per cent. of infant mortality in malaria-infested countries.

The death of any child is a tragedy no matter where it occurs. But in the poor, under-developed countries the high death rate of children from malaria has economic repercussions which reach catastrophic proportions not only for the families directly concerned but for the development potentialities of the community and indeed the entire nation.

Let us grit our teeth and face some of the stark facts squarely. If the figures and statistics about to be given seem cold-blooded and inhuman when speaking of the death of children, we must remember that they help to explain the vicious circle of poverty which holds so many under-developed countries in a tight grip.

For the family, the community and the nation in an under-developed area, the birth of a child is considered a financial investment in food, clothing and education. It is generally recognized that this investment begins to show returns only when the child has reached the age of 15 at which time he begins to contribute to the family and hence to the community and national economy. If a child dies before the age of 15 his potential contribution to the development of his country is nil.

The cost of premature deaths from malaria has been calculated fairly accurately in a country such as Mexico.

Pocket dictionary of diseases

BILHARZIASIS: Sometimes called snail fever. An intestinal disease transmitted to man by a parasite found in tiny snails living in slow-moving streams. It attacks young people, lowers vitality and labour productivity. Irrigation works often help to spread the disease into new territories. A drug exists, but it is difficult to administer. Prevention: if environmental hygiene cannot be improved, then streams should be cleared of aquatic plants on which the snails live. Parasites can be destroyed by treating water with copper sulphate.

CHOLERA: Intestinal disease caused by a bacteria (vibrio) transmitted by polluted water. The patient becomes completely dehydrated and can die in less than an hour after the first symptoms appear. In the mid-19th century, murderous epidemics of cholera raged across Europe. Can be checked by vaccination. During epidemics a "vaccinating pistol" can be used to inject vaccine painlessly and twenty times quicker than by a hypodermic syringe. Long-established centres of infection: India, Pakistan. There were 1,422 deaths in West Bengal during the first six months of 1961. Prevention: clean water.

GOITRE: A disease caused by diet deficiencies. Affects 200 million people. The remedy has been known for a century: add iodine to kitchen salt. Cost of this operation and some prejudices against it still hinder large-scale iodization of salt.

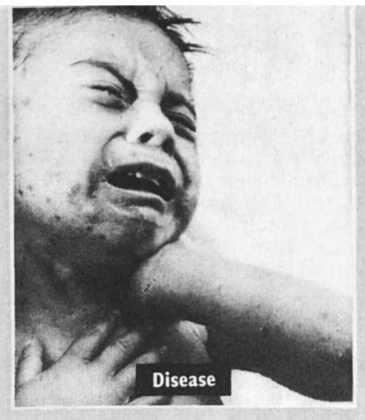
LEPROSY: Ten million sufferers throughout the world, but only 20% receive treatment of any kind. Less contagious than tuberculosis. If detected in time, can be cured, without leaving any traces, by treatment with sulphones. Treatment is nowadays given by mobile teams or in permanent centres not at all reminiscent of the leprosaria of former times.

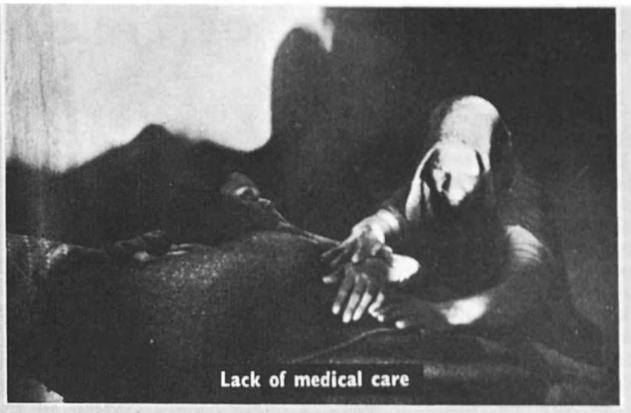
MALARIA: Transmitted by mosquitoes and fought both with insecticides (to kill mosquitoes) and drugs (to kill parasites in the blood of sufferers). 250 million malaria patients in 1955, 140 million today. Newest danger: certain species of mosquitoes develop immunity to insecticides.

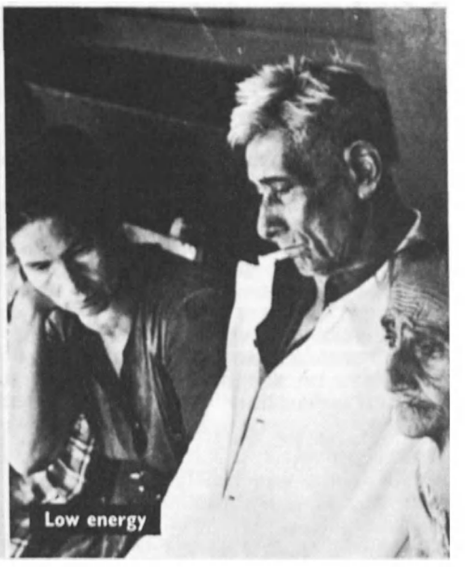
ONCHOCERCIASIS (River blindness): Is caused by a minute worm transmitted to man by a fly, larvae of which is carried by freshwater crabs. When hordes of these worms invade the human eye, blindness results. 200 to 300 million persons are believed to suffer from the disease and entire populations have been known to scatter before it, leaving their lands depopulated. Insecticide sprays are now used to destroy the flies.

PLAGUE: Transmitted to man by fleas carried by rats. Current reservoir of infection: wild rodents including ground squirrels, prairie dogs. Dread scourge of man for centuries. In India alone an average of over 500,000 deaths annually between 1898-1908. Total deaths in 1959-60 only 19. Prevention: anti-rat campaigns.

RABIES: Virus disease transmitted to man by the bite of diseased dogs, cats, wolves or foxes. One of the reservoirs of the disease: Central American bats. Prevention by destruction of stray dogs, vaccination of domestic dogs and cats.







WHO photos

Poverty breeds disease which in turn breeds more poverty. Two of the results of low production are poor nutrition and poor education. These result, in their turn, in sickness and a lack of preventative and curative medical services. Chronically sick people, sapped of energy, are poor workers. Health, education, and social and economic progress go hand in hand.

The average life span of a Mexican today is 45 years of which 30 years are the productive period. If a man dies at 30 then his productive period has lasted only 15 years —a loss of 15 years. Let us multiply this figure by 24,000 —the number of Mexicans who die of malaria annually at the average age of 30—and we find that the Mexican economy is amputated every year of 360,000 potential years of productive contribution. It has been estimated that this amounts to a financial loss to the national economy of 156 million dollars per year—a straggering sum even for a rich country.

Malaria, however, is only one disease in the long list of maladies afflicting millions in the under-developed countries. Lying as many do in tropical climates these countries must cope with the factor of prolonged intense heat which as we know is ideal for the spread of infection. Hot weather favours the extension of disease in three different ways.

1) It permits the rapid breeding of insects which transmit the diseases they carry to man. Sleeping sickness, malaria, yellow fever, dengue, filariasis, rickettsiosis, kala-azar, etc... are all caused by such insect vectors.

2) It is ideal for the proliferation of microbes and tiny parasites in water. Dysentery, cholera, typhoid and paratyphoid fevers, snail fever (bilharziasis) are only a few of the diseases caused by amoebae and bacilli found in water.

3) Finally, hot weather is favourable to the development of intestinal parasites and their eggs, deposited in damp soil from human excrement. This accounts for many of the dreaded intestinal worm diseases, such as the ankylostomes, which are one of the chief causes of chronic anemia and malnutrition.

While the climate of the under-developed countries cannot be changed, the organization of hygienic services, the use of modern techniques, and the intensification of public health campaigns particularly in rural areas, have already begun to show substantial results.

Without water there can be no cleanliness; without cleanliness there can be no health. The sanitary problems of providing pure water and disposing of sewage are

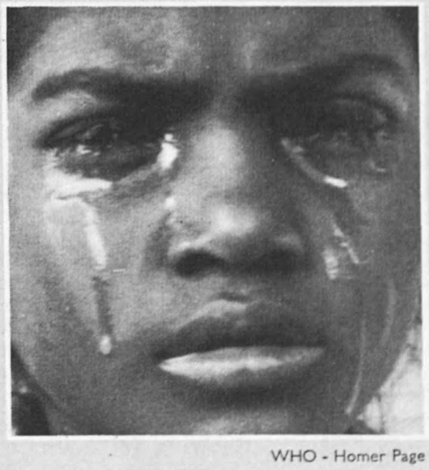
CONT'D ON NEXT PAGE

# of under-developed countries

SMALLPOX: This killer disease is an anachronism today, 150 years after the discovery of smallpox vaccine. It could be entirely eliminated if 80% of the world's population were vaccinated. Modern dangers: faked vaccination certificates; speed and volume of international travel. Most afflicted countries: India, Pakistan, Central Africa. 60,000 cases in 1960. Important: booster shots at regular intervals necessary.

TRACHOMA: Virus-transmitted eye disease (right) can cause blindness. WHO estimates victims at one-sixth of the world's population (500 million persons). In certain countries virtually the whole population is afflicted with 1% of all adults totally blind and 4% "economically disabled" by blindness. Regular treatment with antibiotics checks the infection.

TUBERCULOSIS: 309 million persons given tuberculin tests and 117 million vaccinated with B.C.G. between 1951 and 1960 in 41 countries and territories out of a population of 800 million inhabitants. Latest drug, isoniazid,



WHO - Homer Page

enables patients to be treated at home. One mother recently objected to WHO doctor: "Your pills are fine but they give my children too big an appetite."

TYPHUS: Transmitted by body lice. Killed hundreds of millions of persons in the past. DDT spraying of the body and clothes now successfully destroys the lice.

YAWS: A highly contagious microbe transmitted by simple contact. Chiefly due to poverty and faulty hygiene. Can disfigure and cripple victims for life. Now cured with a single injection of penicillin. 280 million persons examined, 35 million treated between 1950 and 1960.

YELLOW FEVER: Transmitted to man by a parasite-carrying mosquito. Practically eliminated from the Americas. A few centres of infection in central and eastern Africa. Prevention: vaccination and anti-mosquito campaigns. Reservoir of infection: monkeys, from whom mosquitoes suck infected blood.

ZOONOSES: Scientists' name for diseases transmitted to man by animals. Psitticosis (parrots), rabies (dogs), Q fever (goats and cows), Anthrax (cows), Brucellosis (goats and pigs), Bovine Tuberculosis (cattle), Trichinosis (pigs).

Malnutrition - deadly enemy of children

directly linked to two major health problems—typhoid fever and diarrhoeal complaints—whose chief targets are children. It has been estimated that one-quarter of the world's hospital beds are occupied by victims of polluted water. Among the worst enemies of children, especially in hot weather, are the diarrhoeal diseases. Yet 30% to 60% of these deaths could be prevented if pure water supplies were assured. In Asia there are periodic outbreaks of cholera, a scourge which could be wiped out if clean drinking water was available. In Latin America, of all communities numbering more than 2,000 people, 70% have no adequate pure water supplies. In Africa water is sometimes stored underground in ostrich egg shells.

Fetching water is more often than not a woman's job and it is not unusual for them to spend more than half their day at this exhausting work. In some regions the practice of polygamy is justified by the need for the master of the house to have enough wives to keep him properly supplied with water. In Puerto Rico, there was a dramatic drop in the incidence of deaths due to diarrhoea and enteritis—from 480 per 100,000 to 62 per 100,000—after a modernization of the water supply system and drains was begun in 1945.

Malnutrition, called kwashiorkor in Africa, is a polycarence, or "many lacks", in diet due to deficiences of protein, iron and vitamins A, B, C and D. It attacks children at the time when they cease to be breast fed and, deprived of their mother's milk, receive the same food as the rest of the family. Here is how a reporter of "World Health," the magazine of the World Health Organization, graphically described malnutrition as he saw it recently in Latin America:

"Malnutrition is as ugly as it is widespread. Ugly? The word is weak. Monstrous. We should like to think of children as robust, hyperactive, pink-cheeked and smiling. Severely malnourished infants are a mockery of this notion. They are creatures with scabbed bodies, swollen joints. They cringe when you touch their red, cold skin, though seldom do they cry out. Their bleak faces betray little emotion or interest or hope. Their teeth are wretched, their hair is thin. Yet the human being has remarkable strength, and there is no better proof of this than the fact that such pitiable infants can be returned to the bloom of health with nothing more than food."

The transformation can be so complete as to be unbelievable. Indeed, doctors find it difficult to convince parents that only food and not medicine was used to restore their baby's health in the course of a few weeks in a hospital. But the parents must be convinced, and they must be made aware of the importance of nutrition.

Among the pre-school group—children from one to four years of age—about half the deaths are attributable to malnutrition, and most of the other deaths are caused by diseases which would rarely be fatal and usually innocuous in well-nourished children.

In that same pre-school group in Latin America, mortality is ten to forty times higher than it is in the United States or Northern Europe.

Too often, parental ignorance prevents a child from getting valuable foods. After weaning, children are fed nothing but gruels containing mostly cornstarch. Uneducated mothers frequently believe that milk causes diarrhea, not realizing that it does so only because it is not boiled. Even if they can afford meat once or twice a week, many mothers believe it produces worms and cannot be digested by children.

Certainly malnutrition can be reduced through education. But the hard facts of economics are basic to the problem. When a man earns barely enough money to feed his family tortillas, he is in no position to worry about buying eggs for breakfast or meat for dinner. In order to allow him to raise his children properly, his income must be raised.

Thirty years ago about 40% of the malnutrition cases admitted to the largest hospital in Central America, San Juan de Dios in San Jose, Costa Rica, were lost. Doctors unfamiliar with nutrition deficiencies were giving the patients massive quantities of vitamins, but few proteins. Now the treatment has been reversed. Last year the percentage of deaths among malnutrition patients was only two. In acute cases, children are also given the richest protein source of all, blood. Nature is still the best chemist.

It is also beginning to be realized that cases of malnutrition should be followed up at home by public health people, just like cases of infection. In that way the child or the whole family can be "immunized" with milk. Otherwise the patient will soon be back in the hospital.

Since conventional protein sources—milk, eggs and meat—are beyond the purchasing power of the poor, diets must be supplemented in other ways. One approach, an extremely promising one, has been taken in Central America, where malnutrition is severe. It has been pioneered by and is now being applied under the guidance of INCAP, the Institute of Nutrition of Central America and Panama, in Guatemala City in a building provided by the government of Guatemala.

INCAP's 125-man staff is conducting basic research in nutrition, imparting its knowledge to doctors of many nations through summer courses and field schools, and applying its findings in pilot programmes.

After conducting dietary surveys to learn local eating habits, measure food consumption, analyze foods of the area and arrive at an accurate picture of general health conditions, the INCAP scientists set about finding a practical solution. They knew they had to find a cheap protein source, one that was consonant with food habits and within reach of families whose daily income may be the equivalent of a dollar or less.

Their efforts have produced an inexpensive all-vegetable

CONT'D ON PAGE 10

A COSTLY FEVER

In ancient times...

There is no definite proof that malaria was ever the sole or even the major cause of the decline of ancient powers and empires, although this has been claimed in the case of the Greek, Roman, Singhalese and some other civilizations. But there can be no doubt that at certain times malaria has been an important factor in the complicated equation of civilization decay. This was most likely true of ancient Mesopotamia when the irrigation systems began to be neglected, thereby opening the way to an increase in malaria. Thus appeared the famous "chain reaction" whose costly results are evident today—neglect results in malaria which in turn leads to greater neglect.

...and today

World-wide efforts are now being made to break this "chain reaction". One striking example is offered by the Philippines where anti-malarial campaigns have opened up previously infested areas for settlement and agriculture. Within seven years, rice acreage has increased by 20% and other grain-producing acreage by 28%. In 1960 self-sufficiency in rice production was achieved for the first time.

ON THE FRONT LINE AGAINST MALARIA

In Mexico an all-out war has been going on to rid the country and its 30 million inhabitants of malaria. In the "operations room" of the Mexican campaign (left) which is just one sector in the wider battle-front of all Latin America, plans are made to carry the battle to every part of the country. Below, "malarial cavalry" armed with sprayers and insecticides set out from their base and pass peasants at work in the fields as they make for the villages hidden in the thick forests of the High Sierras. Bottom of page, in village of Jacaltepec, equipment is unloaded and wooden-walled houses with thatched roofs are sprayed thoroughly with Dieldrin, an insecticide fatal to the malaria-carrying mosquitoes. Malaria eradication programmes in the Americas covering an area of 13 million square kms., inhabited by 88 million people, occupy 16,000 people, including doctors, engineers and entomologists.

WHO photos by Eric Schwab

2,400 million doctors still needed

mixture called Incaparina, which is developed from corn, sorghum, cottonseed flour and yeast. Mixed into water, which the consumer boils, and flavoured with sugar and cinammon or vanilla, Incaparina becomes an *atole* with the same protein value as milk.

Tested with dramatic success in 1959 and found to be wholly acceptable to Latin American tastes, Incaparina is now being produced commercially by private companies who received the INCAP formula free of charge and give the Institute in return the right to control the price, quality and advertising. Applications for production have been received from all over the world. One plastic package containing 75 grammes of powder, reinforced with calcium, B complex vitamins and vitamin A, costs four cents. It is the nutritional equivalent of a quart of milk costing twenty cents or more. It provides a child's daily requirements of virtually everything but caloric intake and vitamin C, neither of which is lacking in Latin American diets.

THE doctor bent forward to listen to the chest of the child. Through his stethoscope he detected the shrill note he had suspected he would hear. His lips spoke the blunt verdict: "Double pneumonia. It's too late. He will die." He nevertheless gave the child an antibiotic injection. The mother hugged her little one to her breast. The father's fingers fumbled with the acacia branch he was using as a walking stick. Then the sad trio moved slowly away.

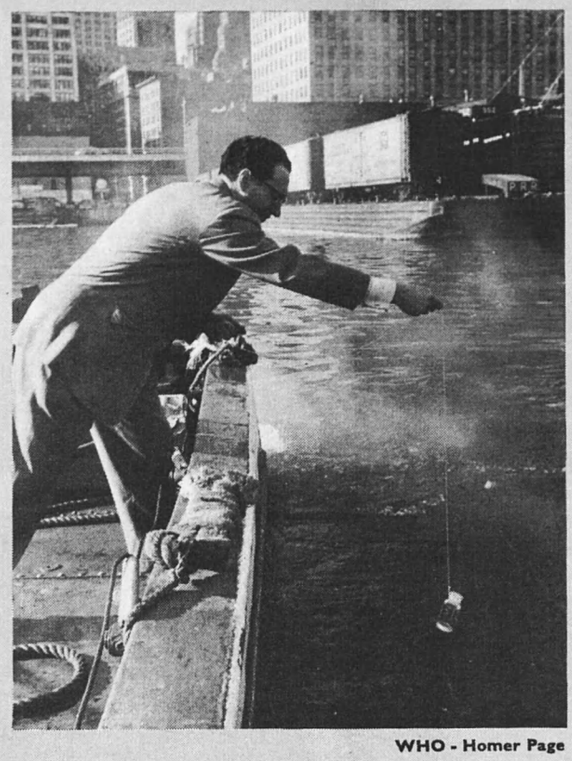
Even at midday it was not uncomfortably hot on this plateau, ten thousand feet up in the rugged Devil's Mountain region bordering Ethiopia's northern frontier with Sudan. The doctor, sent by the World Health Organization, was the very first medical man the inhabitants had ever seen in this region. He was making an epidemiological inquiry, a two-year mission to find out from which diseases Ethiopians suffer and die. In order to reach him, the parents of the sick child had walked since the previous evening.

As night fell the doctor learned that the child had indeed died. First he saw several men walk by his tent carrying picks and shovels. Then, through the dusk, came the sound of chanting. Finally, the funeral cortege climbed the hill on which he was encamped. The child was buried between a candelabra-shaped euphorbia plant and a flame-of-the-forest tree on a site overlooking one of the most grandiose landscapes in the world.

Today, the world faces a serious shortage of doctors. According to figures published recently by the World Health Organization there are 1,500,000 physicians for a total population of 3,000 million.

But whereas Israel has one doctor for 420 inhabitants (the world's most favoured country in this respect) there is sometimes only one doctor for 100,000 people in some other lands. Furthermore most of the doctors practice in cities, leaving immense rural populations without medical care. On the basis of a minimum need for 13 doctors to every 10,000 people, a total of 3,900,000 doctors would be required. Today the world has not even half this number.

For this reason, and following the recommendations of the WHO, many countries which cannot afford to wait until they have all the trained doctors they need are providing accelerated training courses for medical assistants who will set up health centres in country districts. The job of these medical aides will be to report the outbreak of epidemics, to give treatment for minor sicknesses and ailments, to provide medical advice and, when necessary, to send serious cases off to hospital. They are, as it were, the watchmen of health and the first elements in a future medical infrastructure for their countries. In Ethiopia, for example, the training centre at Gondar has already graduated 200 medical aides for the health centres that have now been created in this province which had hitherto been completely deprived of medical personnel.



WHO - Homer Page

PURE WATER A RARITY

For millions of people water is not simply something that flows freely when a tap is opened. In Asia, Africa and Latin America, deadly epidemics are caused by the absence of proper drinking water. Sometimes it has a bad taste. Often it is short supply. When it is impure, child mortality rates from diarrhoeal disease rise alarmingly. Little girls scooping up every last precious drop of water (below) live in a Latin American suburb with 25,000 inhabitants, where water flows from three small taps for a few hours three days a week. In Africa, the public water tap with a clean, cool flow of drinking water (right) is still too often a rarity. Even in economically advanced countries, rapid increases in population growth call for constant vigilance against infections. New York's water supplies (1,100,000,000 gallons are used daily) are checked weekly. To guard against infection beach and harbour water is watched constantly. Above, samples are taken in New York harbour.

WHO - Paul Almasy

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WHO

CONDITIONS OF LIFE THAT BREED DEATH

Above, London seen by Gustave Doré in 1870... vast areas of industrial slums, where thousands of people lived in indescribably foul and noisome surroundings, overworked, undernourished, racked by disease. The same words could well apply to living conditions (left) in many newly-developing countries whose health standards are still only comparable to those existing in many Western countries 60 years ago. To bridge this gap, the eradication of contagious diseases now stands as Priority N° 1. Diseases, like cholera, typhus, smallpox and plague, have been vanquished in economically advanced countries. They no longer spread death and terror across Europe, decimating the population of entire cities as did the plague in London (100,000 deaths) three centuries ago (right).

2 Hazards of progress & prosperity

In the most economically developed countries—a minority of 500 million people—communicable diseases have largely disappeared, infantile mortality has been reduced to a low level and the average length of life often exceeds 70 years. In these countries, 60 % of deaths are due to cancer and cardiovascular diseases.

The publicity given to these two "killers of modern times" is largely due to the absence of other important causes of mortality, to the increase in the average lifespan up to the age when these diseases are most common and also the improvement in diagnostic skill. The "killers of modern times" are, in effect, degenerative diseases. This is what Dr. Pierre Rentchnick, of the University Medical Clinic, Geneva, has to say about them:

THE cells of the human body, under the influence of a regulating mechanism probably sited in the stem of the brain, are born, live and die at a rate that varies according to the kind of tissue involved, the organ, certain exceptional circumstances such as accidents, burns, etc. and finally, the age of the individual.

When, as a result of deterioration of this regulating mechanism, the cell division rhythm is upset because of mechanical, physical, chemical or other reasons in association with a factor X (which some people think is a virus), cell division may occur more rapidly and daughter cells arise which begin to form a tumour and live like parasites at the expense of healthy neighbouring cells.

Some tumours will remain benign, in other words are strictly localized at the site where they arise, while others may become malignant by erupting into the blood stream, which carries the cancer cells to different organs, mainly the lungs and bones. This spread of cancer cells takes place according to laws as yet not elucidated.

Nowadays, with a larger number of methods at our disposal, early diagnosis of a malignant tumour is possible if the patient is examined in time. This early diagnosis is of supreme importance, because the time between the beginning of the tumour's growth and the dissemination of daughter cells (metastases) in the blood stream is, in most cases, relatively long, extending over several months and even years.

During this period minor signs and symptoms may be of the greatest importance and should oblige the patient to go to a doctor. They include injuries which show no tendency to heal, lumps and slight thickenings in the breast, unaccustomed loss of blood from any of the body orifices, constant digestive upsets or difficulties in swallowing, alternate bouts of constipation and diarrhoea with slight traces of blood in the stool, persistent cough or hoarseness, prostatic enlargement and repeated attacks of bronchitis.

The doctor, by a blood test, examination of the stool or X-rays, can study and watch the development of any one of these symptoms, perhaps detect a cancer at its very beginnings, and, depending on the site, propose that it be treated by X-rays, cobalt bomb or surgery.

These assertions, far from being imaginative, are solidly backed by statistics. The campaigns for early detection in the United States, the compulsory check-ups in the U.S.S.R. the organized examinations in certain other countries, have saved many patients' lives through early diagnosis.

Women particularly should undergo regular medical check-ups from the age of 30 or 35 on, so that any incipient malignant tumour of the breast or uterus can be detected and treated in good time. In the U.S.S.R. where the patient not only has the right but also the duty to be in good health, we were able to see, in the course of two visits in 1954 and 1956, that the advanced stages of cancer of the uterus were unknown, for examination was compulsory, well organized, and accepted by the women who were regarded not so much as members of the population but as active and productive elements of a factory, an administration, or an institute.

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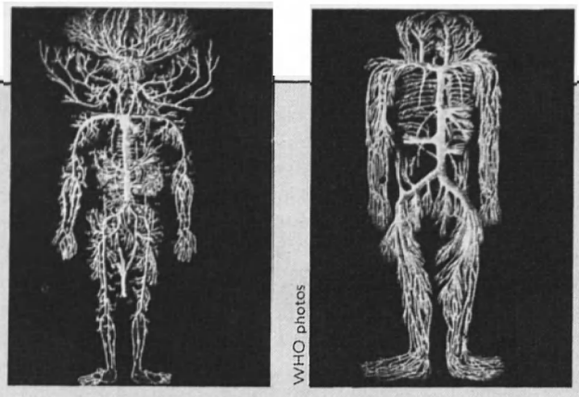
Courtesy of the Clarendon Press, Oxford



WHO photos

'TREES OF LIFE'. The venous system (left) and the arterial system of the human body as depicted in the Medicinal Dictionary compiled by James Robert (1743-1745).

Clogging arteries...

How can arteriosclerosis be defined? A very simple description can be given if an artery is compared to a fine rubber tube that loses its elasticity with the years, clogs up, and becomes infiltrated with different substances it carries. Its interior diameter becomes progressively smaller, and, if greater pressure is exerted, the rubber tube may burst, as a cerebral artery bursts in a hypertensive and arteriosclerotic patient, and leads to a cerebral haemorrhage or a stroke.

Scientifically, arteriosclerosis is the deposit of different fats, cholesterol and calcium, on the inner wall of the great vessels, the aorta and the coronary and cerebral vessels.

These arterial lesions may, to complete the picture, be accompanied by disorders in the coagulation of the blood, which may cause clotting (thrombosis) in the vessels and stop the circulation in places. The tissues normally supplied by these blocked vessels are thus deprived of oxygen and nourishment, and may form a completely inert area. The best-known example of this process is coronary thrombosis.

...and cholesterol

The factors involved in the causation of arteriosclerosis are many and various. One of the most controversial is the importance of cholesterol.

The most interesting arguments on its role in arteriosclerosis come from clinical and epidemiological studies. It is known that the disease is more common among the obese, heavy eater, and in countries with a high standard of living. Epidemiological studies have revealed the existence of a statistical correlation between diet—and particularly the consumption of fatty foods—and the frequency of arteriosclerosis.

The first reaction was simply to lay the blame on cholesterol. But as experimental study continued, the tendency became rather to define the role of cholesterol more explicitly and place more emphasis on that of fats and certain combinations of fats and proteins. This conception also relates to obesity caused by an excessive intake of calories, chiefly from fat-rich foodstuffs. Sedentary life has also been accused of favouring the onset of arteriosclerosis. The sedentary person thinks perhaps he is eating relatively little, but may be eating far too much for his real needs. As he must take in a certain number of calories, he should use them up completely by some sport such as walking or by cycling.

Campaigns to lay the bogy of cancer

The following statistics, published in the United States, show how the chances of cure depend on the early establishment of a diagnosis:

	Rate of cure where diagnosis is early:	late
Cancer of the breast	78 %	36 %
Cancer of the uterus	70 %	35 %
Cancer of the lips	90 %	15 %
Cancer of the skin	95 %	40 %
Cancer of the rectum	40 %	3 %
Cancer of the bladder	55 %	5 %
Cancer of the large intestine	85 %	14 %

By laying the bogy of cancer through educating the public, the campaign for early detection and treatment can be more successful. It will never be known how many thousands of deaths have been caused by false modesty, shyness, the fallacies of popular medicine, or even fear, in people who went to the doctor too late.

Medical associations have perhaps their share of responsibility here. They should play a more active part in the cancer campaign through the press, radio and television.

A campaign conducted on a national scale should obviously be well organized so that the public will not be frightened by words or descriptions which overstep the bounds of reality and unnecessarily create a "cancerophobia."

Health education should therefore be continuous so that little by little scientific and technical terms become familiar and do not create panic. At the present time education tends to be too piecemeal, and cancer is usually mentioned in connexion with the death of a politician or a film star. Then there is a wealth of more or less imaginary detail, and the general view is confirmed that the diagnosis of cancer is equivalent to a death sentence.

Along with cancer (and also accidents), diseases of the heart (or more precisely the whole cardiovascular system) are the most common causes of death in the modern world.

The heart uses a great deal of oxygen, and is amply supplied with blood by two special arteries coming directly off the aorta, the coronary arteries. When these arteries lose their elasticity from the thickening of their walls with deposits of cholesterol—the condition known as arteriosclerosis—they are no longer able to supply the heart muscle with an adequate amount of blood. The result is tissue malnutrition, often revealed by constrictive pain in the thoracic region. It is a general phenomenon that every functioning muscle becomes painful when its oxygen supply drops below its needs, as occurs for example in the muscles of the calf when there is narrowing or occlusion of the arteries of the lower limb.

When instead of a simple narrowing of the coronary arteries there occurs a complete obstruction because of the formation of a clot (thrombosis), the blood flow is interrupted and the area of muscle receiving blood from that artery is deprived of its supply.

This portion of the heart muscle loses its capacity of contracting and before long becomes necrotic, a development called infarction. Depending on where the necrotic area is, death may follow immediately—and does in about 10% of cases. The necrosis may in fact traverse the whole thickness of the wall of the heart, which becomes literally perforated. But in most cases, with present methods of treatment, the infarction is gradually cured (by scar formation) after complete rest for perhaps six to eight weeks.

All epidemiological investigations show that coronary thrombosis has increased in frequency. Mortality from this cause in the United States was 20 per 100,000 in 1930, and 70 per 100,000 in 1949. A similar development has been observed in European countries, with considerable variations according to geographical area and class of population. It has also been observed that coronary thrombosis is much less frequent among the Bantus, the Japanese, and the Nigerians.

On the basis of these differences, an attempt has been made to single out factors that play a part in the development of the disease: constitutional and hereditory

ANCIENT MALADY, MODERN EPIDEMIC

Often thought of as a "new" disease, poliomyelitis, or just "polio", is known to have existed in ancient times. The Egyptian stele dating from 1500 BC (right) shows a young man with a withered leg that is characteristic of paralytic poliomyelitis. But polio's epidemic onslaught seems to have been reserved for the present day and age. Gradually the disease has come to be better understood and research workers have found vaccines to prevent it. Physical re-education (on left) can often restore use to paralysed limbs.

WHO photos

factors, factors related to ways of life and especially to consumption of foodstuffs rich in fats and particularly in cholesterol, physical exercise, mental stress, and the consumption of alcohol and tobacco. Statistics in some countries tend to show that coronary thrombosis is commoner among the wealthier classes—their physical activity is less, their diet richer in fats, and their cigarette consumption higher.

From the scientific point of view, it was logical to pay special attention to eating habits, for the coronary arteries in infarction are characterized by a thickening of their inner walls chiefly due to deposits of fatty material among which cholesterol is abundant. Among some sections of the population it has been observed that when the amount of fat in the every-day diet is high the cholesterol level in the blood also tends to be high, and vice versa.

Among all the populations so far studied, those with a diet poor in fats are those which seem to have a relatively low incidence of arteriosclerosis, angina pectoris and infarction. In prosperous countries like the United States and Canada, more and more fat is being eaten. In some of the less developed countries, the proportionate increase in fat consumption is even greater. In Japan, for example, where very little fat used to be eaten, the consumption is at present five times greater than it was immediately after the war.

Investigations into the part played by tobacco in the causation of cancer of the lung have shown incidentally that mortality from coronary thrombosis is higher in heavy smokers. It is surprising how frequently sufferers from coronary thrombosis turn out to have smoked large numbers of cigarettes (40 to 60 a day) up to the time of their heart attack. The action of nicotine on the arteries of the arms and legs is known—a temporary constriction causing a cooling of the skin—but we know less about its action on the coronary arteries.

As concerns the effects of alcohol on the development of coronary thrombosis, views at present are divided and fresh evidence is needed.

Until the end of the last war, the doctor's concern in the presence of coronary thrombosis was to ease the pain by means of morphine and to order bed rest. The pain he could control, but he was comparatively helpless in the face of the illness, wich often lead to death.

In the last 15 years or so, a new method has been greatly developed—treatment with heparin and dicoumarol derivatives. The value of these drugs lies in the fact that they reduce the clot-forming tendency of the blood, and today it is considered thay they have brought down the mortality from coronary thrombosis by some 25 to 40%.

The surgeons who have dared to violate the sanctum of the heart—formerly regarded as untouchable—have tried to supplement medical treatment by operation. Some have tried to join neighbouring tissues to the heart in the hope that new blood vessels will increase the supply of blood to the heart muscle. Others have gone so far as to open the coronary artery to remove the clot responsible for the infarction—a bold operation that has been successfully tried only in a small number of selected cases.

The most recent experiment in the treatment of coronary thrombosis is not surgical but medical. With new cineradiographical techniques it is possible to visualize the coronary arteries and localize the clot. Then, by a sound placed in the artery, the clot itself can be injected with fibrinolysin; this natural constituent of blood plasma has the property of dissolving the clot in the early stages of its formation.

Mental illness does not figure prominently as a cause of death, but of recent years has taken on such importance in our lives that it needs to be mentioned along with the "killers of modern times."

How do people become mentally ill and how are they cured?

Warning signs: Headaches, inexplicable fatigue, change of personality, sleeplessness, loss of memory, a lowering of work output, all require careful consideration by the doctor to distinguish between a passing indisposition and the first warning signs of mental disease. If preventive treatment is given at this stage there is every possibility of avoiding mental illness.

Mental illness: A mental patient is a person whose ability to adapt himself to this environment is disturbed. Often it is advisable to free him from the usual demands of social life. This is the primary reason for hospitalization and the hospital must provide the required atmosphere.

The right atmosphere: The psychiatric hospital must

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Europe's 2,000,000 mental patients

be a therapeutic community, that is, an artificial social environment that strengthens the adaptive faculties that have remained healthy and allows the others, first to rest, and then gradually to be re-educated. Group activities should be organized in accordance with the capacities of the majority, if not all of the patients. These activities, whether games, self-expression in an art or craft, sports, lectures or discussions, should preferably be developed on the initiative of the patients themselves, so that, as far as possible, they correspond to their needs.

The therapeutic art: It is the task of the doctor to help patients resume their interest in the world around them and gradually to grow away from their pathological attitudes and engage in useful activities. Once the therapeutic atmosphere has been created, more precise techniques can be applied.

Psychotherapy: The aim of this treatment is to eliminate the cause of internal conflict and permit the patient to understand himself better.

Insulin shock: The method consists of injecting increasing doses of insulin until the patient reaches a state of coma which is finally ended by giving him sugar. The treatment is repeated every day for several weeks. The patient's personality, temporarily disintegrated during the coma, tends to return to normal on awakening.

Electric shocks: This method provokes sudden loss of consciousness accompanied by important changes in the body fluids, often followed by recovery of mental balance, particularly in cases of melancholia.

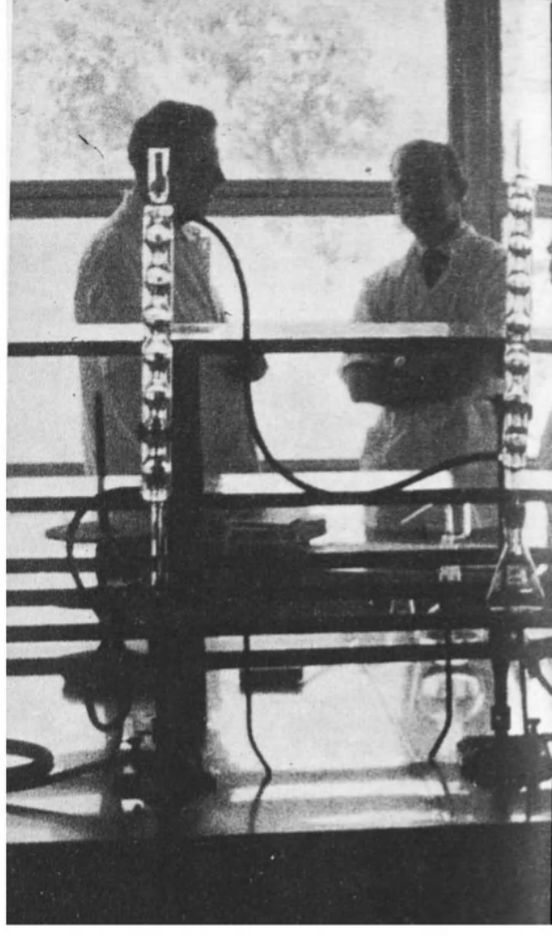
Narcotherapy: Also called "narco-analysis", this treatment consists in intravenous injections of an anaesthetic to remove the patient's inhibitions and even to plunge him into the realm of the unconscious so that he can express himself, relive certain experiences, and thus be liberated from painful anxieties and sometimes deeply rooted complexes. Another method is to put the patient to sleep with the help of various narcotics for 16 to 20 hours a day over a period of 15 to 20 days so that the overworked nervous system may rest and emotional balance be restored probably through dreams. This is known as the sleep treatment.

Modern drugs: Chlorpromazine and reserpine and many others that chemistry is discovering in great numbers, seem to be able to selectively relax those functions which are most commonly involved in mental disease. Prolonged application, combined with psychotherapy and sociotherapy, even without resorting to artificial sleep, sometimes brings about a veritable resurrection. At all events, these drugs relieve the most painful symptoms of mental disorder such as agitation, anxiety, aggressiveness, in nearly all cases.

Results: These vary according to the gravity and length of the disorder. On the whole, however, one can say that properly co-ordinated treatment under satisfactory technical conditions make it possible to restore 70 to 80 per cent of mental patients to normal social life. The average stay in hospital, for patients who are cured, is about four months. If we recall that a few years ago only about 30 per cent recovered and that these patients required on the average more than a year to get well, the progress that has been made is evident.

Those who founded the World Health Organization nearly 15 years ago defined health as: "A state of complete physical, mental and social well-being." In the field of mental health particularly, much remains to be done if this definition is to be widely applicable. There are 2,000,000 mental patients in Europe alone and more than one-third of all hospital beds are for mental patients.

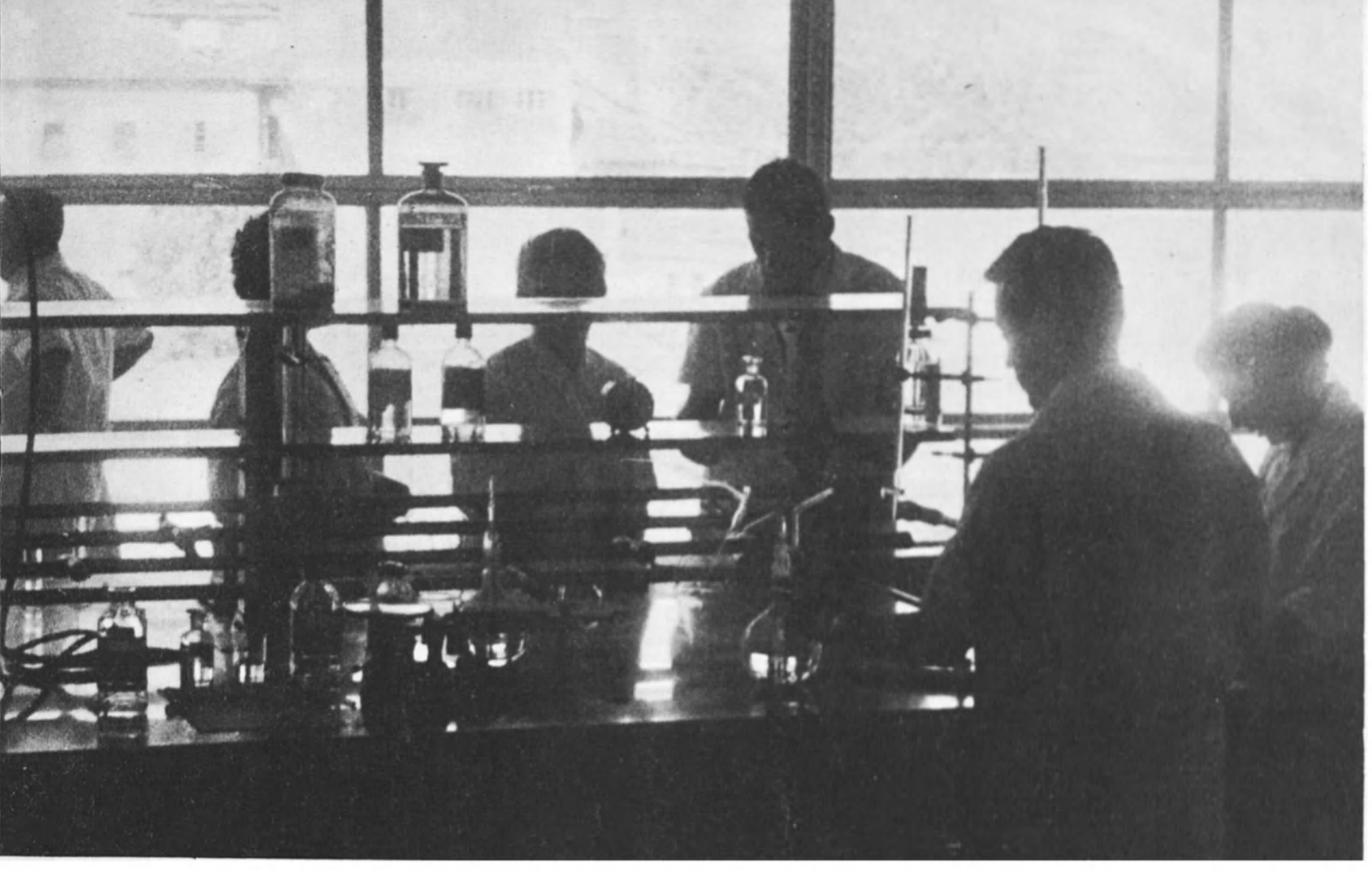
Today the battle for mental health is being fought on many fronts. The psychiatrist has ceased to be merely a "doctor for the insane." With the help of his colleagues from other disciplines he now tries to do something for the many people who suffer neurotic difficulties and to contribute to the cure of psychomatic disorders like gastric ulcers and asthma. Moreover there is an increasing tendency to introduce mental health concepts into public health practice and to seek the advice of psychiatrists on wider social issues such as community development and industrial organizations.



WHO-Eric Schwab

"The establishing of institutes and research laboratories (concerned with problems ranging from housing and social conditions to mental health and epidemiology) is one of the greatest contributions a country can render to the progress of science", declared the World Health Organization, in a major report on the health situation around the world, covering 157 countries.

Scientific research, today not only occupies an enormous place in human society, but is actually doubling its activity in the course of each decade. This progress has been charted in "Current Trends in Scientific Research", prepared by Professor Pierre Auger, former head of Unesco's Department of Natural Sciences, and published by Unesco. From this comprehensive survey of world scientific trends and technological research (See The Unesco Courier, July-August 1961) we present here some salient facts on the development of the medical sciences.



MEDICAL RESEARCH TODAY

by Pierre Auger

The progress, of benefit to mankind, that has come from great discoveries such as the microbial origin of communicable diseases, chemotherapy, antibiotics, residual insecticides, etc., has actually taken medicine almost from the Middle Ages to its present level in no more than the past half century.

Although the diagnostic skills of doctors thirty to forty years ago can still be admired, the therapeutic facilities at their disposal can now be seen to be, in many instances, little better than pious hopes, and those few that were effective were not well understood and were often not properly used.

Clinical experience and acumen are greatly amplified by precise investigations; skilfully prescribed and compounded medicines, to be taken with water before or after meals, are largely replaced by single substances administered in a definite dose per kilogramme of body weight at intervals chosen to maintain a desired blood level.

A further important and fundamental development greatly influencing research is the change in attitude from that wholly concerned with the sick individual to that more widely concerned with keeping the healthy person fit. The concern for sickness of the patient has thus widened into that for the health of the community. The older communicable diseases, for example tuberculosis and syphilis, are being rapidly conquered and the problems of the newer ones, such as poliomyelitis and other virus diseases, are being solved.

These benefits are of value both to developed and underdeveloped countries. For the former where people live longer and where their lives are more sophisticated the importance of cancer and the degenerative diseases is great; in the underdeveloped countries so great is the rate of change that these diseases may well be problems there in the next generation. Another result is the increased size of populations and the attendant problems of food supplies and nutrition; both of these call for much thought and study.

The results of past research have been great and beneficial for man; those of the increasing research of the future can be expected to be no less, and will arise more and more from fundamental studies though these may often commence during the search for answers to practical problems.

Medicine and medical research are no longer mainly concerned with bedside observations on diseased persons and the study of the effects on them of empirical remedies.

Advances in medicine today are based on the study of the healthy as well as of the sick and the dead, particularly in relation to their total bodily and mental environment. Disease is a condition that can be defined in terms of deviation from the normal, and this means that the medical research worker must observe the behaviour of the so-called normal man as well as that of the sick one.

For the effective prosecution of medical research not only is the clinician needed but also workers in a number of other disciplines, such as physics, nuclear sciences, chemistry, biochemistry and statistics. These are concerned with the examination of normal, as opposed to abnormal phenomena, which are studied in the sick person by the clinician and the pathologist.

For future progress clinical medicine must be integrated with the basic sciences. Many medical problems are in fact really problems in applied biology, physics, che-

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Mobilizing the sciences

mistry and mathematics. Thus surgery is no longer a matter of operative technique, important as this may be. The surgeon must understand his patient in his biological and social setting, his metabolic and electrolyte balance, his nutrition and his respiratory, circulatory, hepatic and renal functions.

Medical research is no longer a bedside study separated from the laboratory. The first half of the century witnessed the disintegration of medicine into specialties. Now in the second half it is being reintegrated with other disciplines derived directly from the basic sciences. Medical research is becoming more and more a combined operation conducted on a wide front. Progress in cardiac surgery, for example, demands the participation of a team of experts versed in different disciplines. The study of drug addiction needs the co-operation of the pharmacologist, biochemist, psychiatrist, criminologist and sociologist.

There have been political changes in the pattern of medical research. At one time this was done mainly in the universities, but now it has spread from their confines and is carried out in hospitals and research institutions and by organizations sponsored by central government and international organizations, such as the World Health Organization.

In the past, national governments were interested in medicine mainly from the preventive aspect. By introducing the necessary legislation and a public health service many countries have reduced the incidence and morbidity of the major bacterial infections, although these have to a lesser extent been replaced by virus infections.

With the changes in the economic structure of many parts of the world, the community has had to play an increasing part in the economics of medicine, particularly in the provision of medical care, and the financing of medical education and research.

As a result of government sponsorship at the national and international level, attention is being focused on the study of diseases that were once considered of minor medical interest. Mental illness and the chronic degenerative diseases such as rheumatism, coronary disease, atherosclerosis and diabetes, are attaining greater prominence in the practice of medicine and in research programmes. They are of economic importance because of the chronic disability that they cause.

Government intervention is also changing the pattern of medical economics. A whole body of research is growing up into the economics of the provision of medical care, and although strictly speaking not a scientific activity, it is a necessary one.

Another economic trend in medicine that has repercussions on medical research is the growth of health insurance, which in some countries has grown to such an extent that there are very few free beds left in public hospitals. This means that there are fewer hospital patients available as subjects for research and teaching. Furthermore, the increasing dependence of universities on government funds will result in some of the research done there being subordinated to the needs of the nation and national security. This is particularly true in the field of nuclear medicine.

Government aid can be of value to medical research in providing funds and amenities for those projects that are socially urgent and those than can only be solved on a national scale. In some cases the government has acted through a nationally formed research institute, of which thirty or more have been created in different countries in the last fifty years.

A corollary to national government aid is international co-operation in all fields of medicine. An increasing number of research workers, and research workers in training, are improving their knowledge and outlook by spending a period in the hospitals and research organizations of another country.

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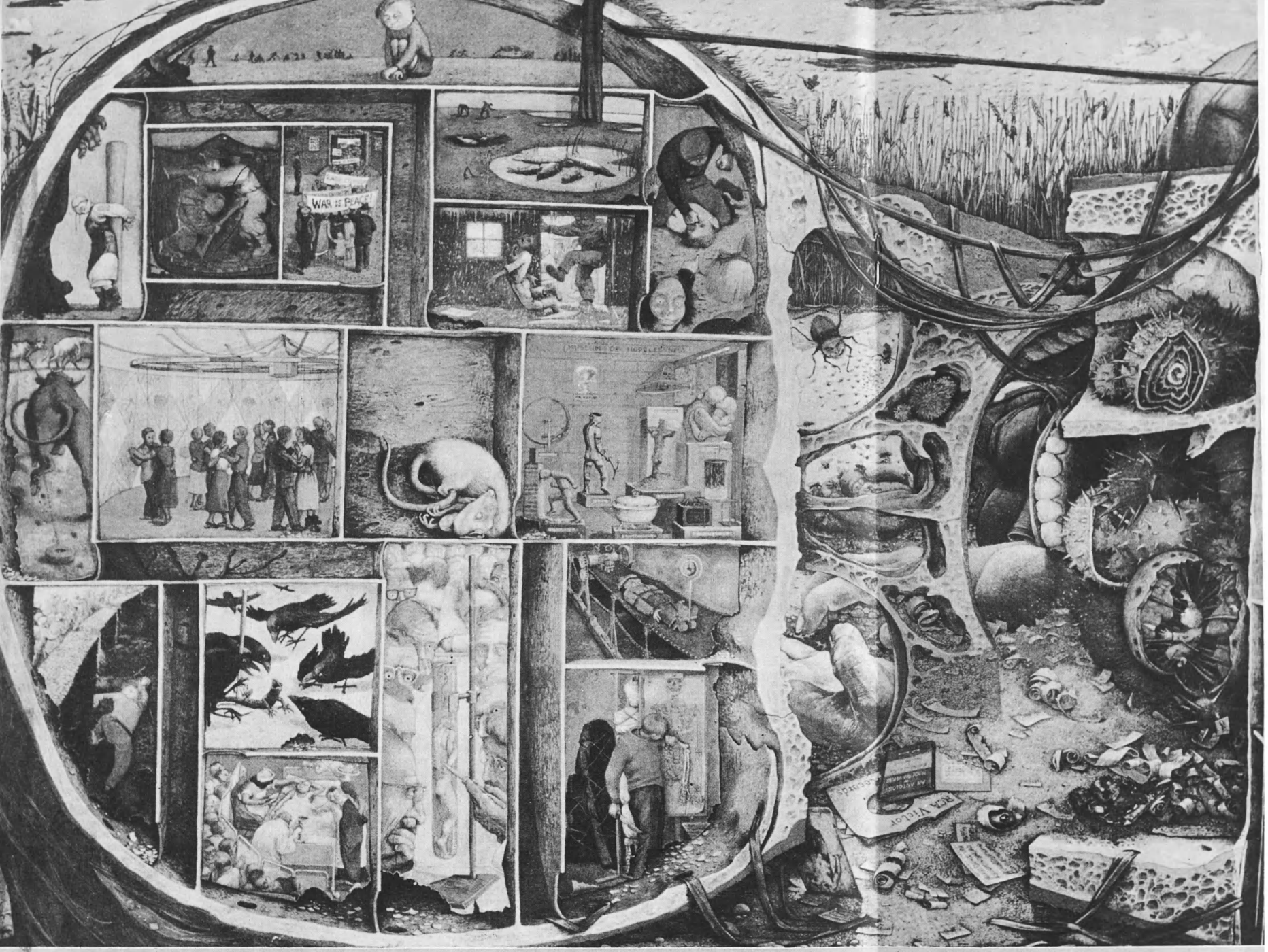


The labyrinth of a sick mind

Fortunately, the artist who becomes ill does not lose his creative ability. This enables the progressive psychiatrist, using new techniques, to stimulate artistic talents and thereby gain deeper insight into the sick man's mind. It is not an accident that the painting reproduced here recalls the work of Hieronymus Bosch, who was obsessed with the folly and horror of this world and commented on it in nightmare terms. The painter, a young Canadian who was familiar with Bosch's work, did it while he was a patient in a mental hospital in England. He shows himself lying on stoney ground, his skull divided into the compartments of a maze from which there is no escape. Various compartments depict his miserable childhood, his sympathy for the Ukraine, his mother country, his disillusionment with political activity, his hopelessness at ever being able to share other people's faith in ideal values, his feelings of unreality and of estrangement from the sunlit "normal" world, his frustated sexuality, his fear of imminent destruction, his impulse to cut himself to the bone to see if he has a solid skeleton like other men. The crows represent doctors viewed in a paranoid light. Below this is a fantasy of hospital treatment seen as a benevolent conspiracy. In the centre, at the bottom, he shows how it feels to be the subject of a clinical conference. The defeated rat that can find no way out is also himself. It is the work of a hypersensitive, obsessional patient, a prey to depressive ruminations and feelings of unreality. His severe inhibitions against expressing or even admitting positive feelings have prevented his using his undoubted talents to their fullest advantage.

Studying man against his background

With the growth of industrial development in many countries industrial health and welfare are becoming of increasing importance, and both government and industry are concerned with reducing wastage of manpower due to disease and injury. Many large plants now have rehabilitation schemes for their workers after injury or illness.

The pharmaceutical industry has contributed towards progress in therapeutics by the discovery of a number of new and useful drugs. Whereas at one time new drugs were discovered in university or hospital laboratories, almost all those marketed in the last fifty years have come from the laboratories of the pharmaceutical industry. This industry is also sponsoring research in the hospitals and universities on fundamental work.

In recent years there has been a trend towards the study of man in relation to his environment. Illness, particularly mental illness, is being studied against its social background. If the concept of positive health is to be pursued many sociological factors must be considered.

Medical education programmes are undergoing modification. Medical teachers are going into the underdeveloped countries on an exchange basis to train doctors, and new medical schools are being built there. The need for a close relationship between medical education and medical research is emphasized in some quarters.

It is now accepted that medical teachers benefit by undertaking research and similarly the education of the medical student benefits by carrying out a piece of simple research. The increasing number of full-time appointments in medical schools should give teachers more time for reflection and research by relieving them of the necessity of part-time medical practice outside the hospital.

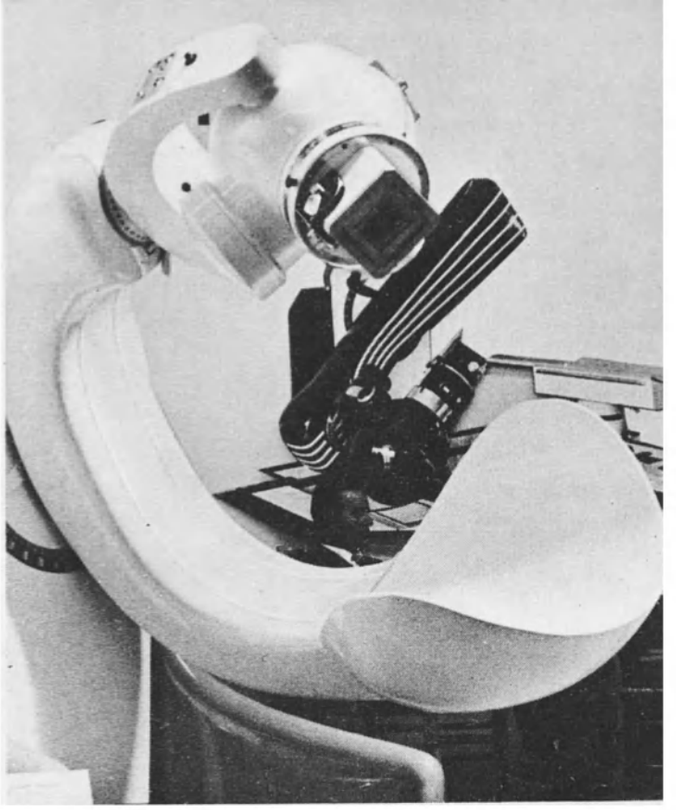
The general public is becoming more sickness-conscious as a result of the medical information that is now disseminated by press, radio and television, although it is often the more sensational aspects that are stressed. The patient can no longer be treated in ignorance of his disease. It should be explained to him in simple terms and if incurable he should be told how to live with it. Much disease would be prevented if the layman were taught the principles of healthy living without producing hypochondriasis.

With the great reduction in communicable diseases and with more adequate nutrition there is a resulting increase in population and increase in length of life. The ultimate aim of geriatrics which is concerned with problems of aging has been summarized as the adding of life to years and not years to life.

The implications of the longer life are seen when the expectation of life of 30 years for rural populations in underdeveloped countries is compared with that of some other countries of perhaps 70 years. In the latter populations there will obviously be many more older people than in the underdeveloped countries.

In the last decade the problems resulting from this have come to the fore. They are social, economic and medical. There is increasing need for older people to be able to earn at least part of their day-to-day expenses and even more to be able to care for themselves as long as possible. Much success has been achieved in preventing the elderly from becoming immobilized and bed-ridden.

Further work is needed into the understanding of all aspects of aging and this probably involves studies of all ages and of the degenerative diseases and cancer. Experimental research on aging is now being done in some centres. The varying rates of failure of different organs with age opens up a wide study of the part played by environment in its broadest sense and by genetics. Thus it will be seen that the problems of the aging will benefit from many aspects of medical research while their study will in turn contribute to the solution of other medical problems.



RADIOACTIVE ATOMS are today used both to track down cancer (radio-isotopes act as "tracers" to locate its site) and to attack cancetous tissues. Following exhaustive research, radium, once the main weapon for attacking cancers, has now commonly been replaced by radio-cobalt, controlled and directed by machines like the one above.

CANCER PREVENTION & CONTROL calls for a world-wide expansion and co-ordination of research, not only to prevent a duplication of effort, but because of marked differences in the incidence of various forms of cancer among different populations. Laboratory animals, like these mice, are widely used in research work on cancer.

Photos WHO

PROFESSOR PIERRE AUGER *is Chairman of the National Centre of Space Studies in France and of the Administrative Council of the International Computation Centre in Rome. He is the author of many studies in the field of nuclear physics and his works include* Les Rayons Cosmiques (*Cosmic Rays*) *and* L'Homme Microscopique (*Microscopic Man*).

AN S.O.S. FROM CABLEMAN TO FISHERMAN

by C. S. Lawton

DEEP-SEA TRAWLERS with their sea bed fishing gear have been responsible for many cuts in international telephonic communications through their trawls fouling ocean cables. It is not uncommon for a cable repair ship to find a fleet of as many as 40 large trawlers at work in the area of ocean-bed cables. Damage occurs in practically every month of the year and in depths of well over 200 fathoms (1,200 feet) of water.

Chauffard © Rapho, Paris

EVEN in the earliest days of ocean cables, commercial fishing constituted a hazard, but radical developments have come about in both industries to so aggravate the situation that now it is causing grave concern to the communications companies.

Years ago fishing was carried out with hand lines by small local groups with limited financial resources and little, if any, government assistance. However, the popular realization of the importance of developing this potentially vast source of food has brought with it great emphasis by the governments of the world upon basic research to improve fishing methods, and the granting of financial aid to the fishing industry.

The introduction of bottom trawling in the early 1900's at once increased the hazard, particularly as (instead of using two ships to keep the net spread between them) most trawlermen tow the net from a single vessel, dragging a pair of Otter boards along the bottom attached to, but in advance of the outer edges of the mouth of the net.

The safest bottom for a communications cable is flat and even, irregularities cause suspensions across small concavities. Because cable is inherently stiff and sometimes has a tendency after having been uncoiled from a ship's tank to retain a bit of helical springiness, these suspensions cannot be avoided entirely by laying cable without residual tension. As a matter of fact, if the bottom is sufficiently flat and even, better results sometimes may be achieved by laying it bartight.

Naturally, if a cable is not resting on bottom at all points and a trawl board, its lower edge scraping along the bottom, is towed across it where the cable is suspended, the probability of fouling is great. Poor maintainance of the iron shoes which sheath the lower edge of the boards and the bolts which hold them in place, as well as the shape of the boards themselves and their attachments, often are contributory factors, but the chief causes of fouling reside in the cableman's inability to make cable conform closely to the contour of the sea bottom and the fisherman's conviction that the boards cannot be towed off bottom and still function properly.

The fishermen's stock argument runs: "The fish were here before the cables", but even this "ain't necessarily so". Fish have a way of migrating from one area to another with minor changes in water temperature brought about by shifting currents which carry their food (plankton) and by the gradual melting of the polar ice caps. As an instance of the latter, Cape Cod, Massachusetts, the waters around which were teeming with codfish when the Cape was named, supports little commercial codfishing today whereas this fish is plentiful in the waters around southern Greenland, the inhabitants of which scarcely knew what a codfish looked like sixty years ago.

The advent of refrigeration at sea and the ability to ship frozen fish inland have revolutionized the fishing industry. The number, size and power of trawlers and the depths in which they operate, all have increased. It is not uncommon for a cable repair ship to find a fleet of twenty to forty large trawlers of several nationalities milling around in a small area on the continental shelf,

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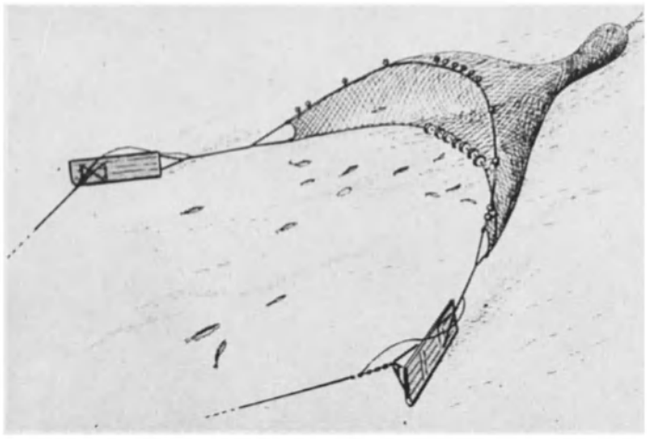

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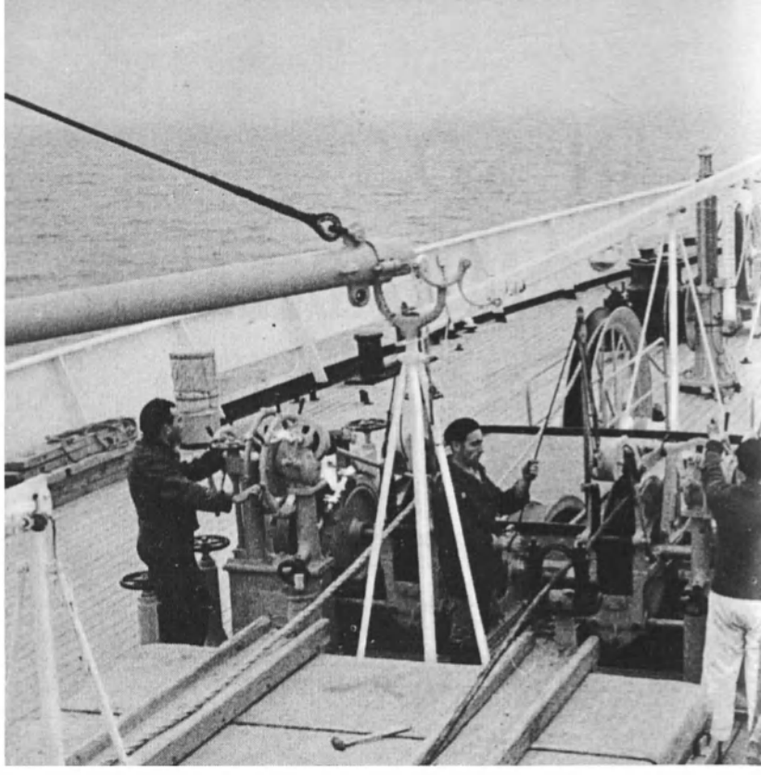


OCEAN-BED TRAWL (above) is a broad net whose mouth is held apart by a pair of Otter boards which drag along the bottom of the sea. Some of the modern trawlers and their gear are so powerful that they can break the strongest communication cables, in some cases without even being aware of it. Repairs by cable ships (right) are costly and time-consuming and cause major traffic diversions in International communications.

S.O.S. FROM CABLEMAN *(Cont'd)*

Can two 'freedoms of the seas' be reconciled?

well over a hundred miles from land, wherever bottom fish are abundant. The season is limited only by the presence of heavy field ice. Cable damage occurs in practically every month of the year and in depths to well over 200 fathoms of water.

There was a time when a cable could be designed for a reasonable degree of protection by sheathing it with heavy wire armor. That day has passed. Some of the modern trawlers and their gear are so powerful that they can break the strongest communication cables, in some cases possibly without even being aware of them. These cables have tensile strengths on the order of twenty tons or more but under certain conditions it takes less than the full tensile strength of a cable to break it.

BECAUSE two of the basic concepts of the freedom of the seas, the freedom to lay cables and the freedom to fish, are in serious conflict, the problems at issue must be resolved on an international basis if substantial improvement is to follow.

Efforts have been, and are continuing to be made to re-design the Otter board. The present bottom trawl is not an efficient tool in that most of the fish in its path are able to escape and almost one-third of a trawler's propulsive effort is absorbed by the friction of the boards scraping along the ocean bottom. Nevertheless, where fish are plentiful it is serving its purpose.

In the past those fishes which inhabit depths intermediate between the surface and the sea bottom have been most difficult to catch (except by hand-lines). Recently, however, the sciences of "mid-water trawling" has been the object of considerable research by government agencies and a few private inventors. One product of this research is the buoyant Otter board which can be controlled so as to operate off bottom.

Theoretically it should be possible to utilize such boards with bottom trawls, since the boards are positioned some distance ahead of the net and a slight upward pull of the boards so positioned should not be enough to lift the heavy weighted foot-rope of the net off bottom. Their elevation by as little as a fathom or two would cause them to ride harmlessly over cables while from the fishermen's standpoint there would be either a substantial saving in propulsive effort or a substantial increase in speed of towing (which improves the chances of catching fish).

Where the bottom is consistently penetrable to a depth of from 7 to 24 ins. and currents are not too strong for a surface vessel to manœuvre, cables have been successfully buried over distances of about 20 miles in the ocean bottom across a fishing area ranging in depths between 100 and 450 fathoms of water, but this technique is too limited in application in the present state of the art to be of much general assistance.

Research is going forward, however, in the extension to deeper water of methods utilizing a bottom vehicle, television-controlled and powered from a surface vessel. The under-water television camera, with its ability actually to photograph cables lying in *situ* and trawl nets in action gives scientists a new and powerful tool for probing these mysteries, but how long it will take to bring about the desired new techniques of cable laying and fishing is anyone's guess. They certainly are not imminent.

Efforts have been made to move cables out of heavily-fished areas. Ten years ago Western Union moved several of its transatlantic cables northward off the east coast of Newfoudland on the advice of government biologists that the cod would never be found there in sufficient density to support commercial fishing. It was known that redfish were there but at that time redfish were not considered too suitable for the market and when caught most of them either were thrown back or used for fertilizer.

FROM about 1956, however, as cod became less plentiful east of Newfoundland and other nationalities sent their trawling fleets across the ocean to fish, the lowly redfish, under the more attractive name of ocean perch, became "socially acceptable" and can now be purchased in frozen form almost anywhere in the United States. The result has been that the cable diver-

© Rapho, Paris

sions which were costly and time-consuming to make, afforded only a few years of immunity from damage.

One of the chief complaints of the trawlermen is that unless they have the positions of the cables they cannot very well avoid crossing them, but until quite recently these positions have had to be kept confidential for security reasons. However, the wide-spread damage since the last World War has convinced most governments that the fishermen already have a fair acquaintance with cable routes so that not much is to be gained through continued secrecy.

Now that most of the countries concerned have agreed to eliminate the security restriction it has been possible to publish charts for distribution to trawlermen covering fishing areas where there are cables, showing the route of each cable but without individual identification as to owner or terminal points; cables not now in use are clearly marked, however.

Every available means is being employed to bring this matter to the attention of trawler owners, government officials, and the fishermen themselves and to see that they are kept fully informed.

THE International Convention accord of March 14, 1884, for the Protection of Submarine Cables, is evidence that broken cables have been an international problem of long standing. The twenty-seven signatories agreed that anyone who hooked a cable must sacrifice his gear rather than cut the cable. Cable owners were required to pay for the lost gear.

Appropriate legislation enacted by the member nations still is in force but has done little to alleviate the problem. Before the advent of the botton trawl, ships' anchors had been the chief cause of cable damage, confining it to fairly shallow water. But when a fisherman has to sacrifice a trawl net, complete with Otter boards, he may well find himself called upon to sacrifice a catch of fish in the net and, unless he has a spare set of gear on board, valuable fishing time while he proceeds to port to replace it. When he returns the fish may not be there, of course.

The consequential damages (as opposed to the sacrifice of the fishing gear itself) are difficult to assess with any reasonable degree of accuracy and the cable operators take the view that they cannot be held responsible for them. Were they to accept responsibility, the way would be open for fishermen to ignore the presence of cables entirely, whereas it is most essential from the cable operators' point of view that there remain some deterrent to the practice of trawling over cable lines.

When a fisherman's trawl gets caught on something, not knowing what he is foul of, the natural tendency of the fisherman is to try to free his gear. In doing so, if it happens that he has hooked a cable, he is in grave danger of damaging it electrically, even if he does not break it entirely. Thus, whether he elects to cut away his gear and claim damages merely on suspicion of having hooked a cable, or whether he brings the cable to the surface and cuts his gear away with the full knowledge that it is indeed a cable (thereby still further increasing the probability that he has caused damage), the fact remains that it is a hazardous practice to tow a bottom trawl over cable lines.

AS an example of what can happen, Western Union lost four transatlantic cables in twenty-six hours on February 24 and 25, 1959, three days after the interruption of TAT 1, the telephone cable laid in 1956 between Canada and Scotland. Six days later (on March 3) Western Union lost still another. The damage to the telephone cable included a tensile break and a cut less than a mile apart. Damage to the five Western Union cables included ten tensile breaks and two flush cuts.

These cables are armored with No. 1 BWG galvanized steel wires which were in good condition. The depth of water ranged from 170 to 215 fathoms. The telephone cable was out of use for eight days. Western Union lost six days on each of two cables, seven on another, eight on another, and fifty-six on the last one due to an ice field (on the edge of which the trawler evidently had been working) moving over the cable, making it inaccessible for repair.

The repairs required a total of 43 days of ships' time and necessitated the remplacement of 19 miles of cable. The total cost to the cable operators for repairs on this occasion was about $120 000. This, of course, did not include the cost of traffic diversions and hire of alternate facilities where available.

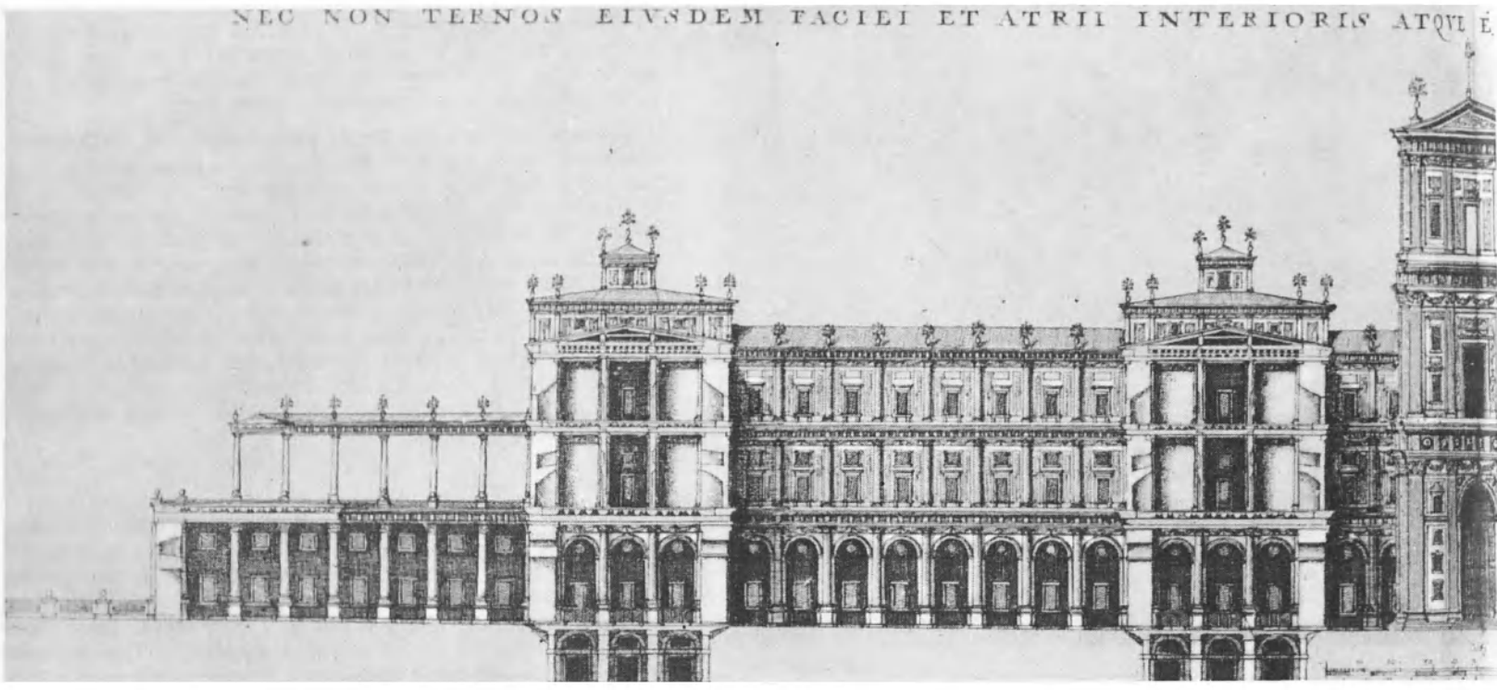
In the first ten months of 1960 Western Union cables were individually interrupted or made faulty by trawlers on forty-four occasions, and the telephone cables were broken on several occasions also.

When cable interruptions come singly, suitable fall-back arrangements can be made to overcome the loss but when several cables are broken within a matter of a few hours, such as has happened off Newfoundland repeatedly, there is bound to be disruption of service and long delays in its restoration.

Despite the international scope of the problem and the best efforts of those engaged in telecommunications, neither of the two recent international conferences on the Law of the Sea have been able to cope with it, having been too deeply absorbed in the controversy over the width of the Territorial Sea. On the other hand, it must be clear to any serious student of the matter that the provisions of the 1884 Convention are ineffectual in dealing with the situation which confronts us today.

In the early days of radio it was the hope of the fishing fraternity that this invention would spell the end of cables and the annoyance which went with them. No doubt they are pinning their present hope on the development of communication satellites, but from the amount of money now being invested in new cable projects and the extent of these projects it seems like a forlorn hope for the indulgence of this generation of fishermen.

C. S. LAWTON *is General Manager of the International staff of the Western Union Telegraph Company, New York.*

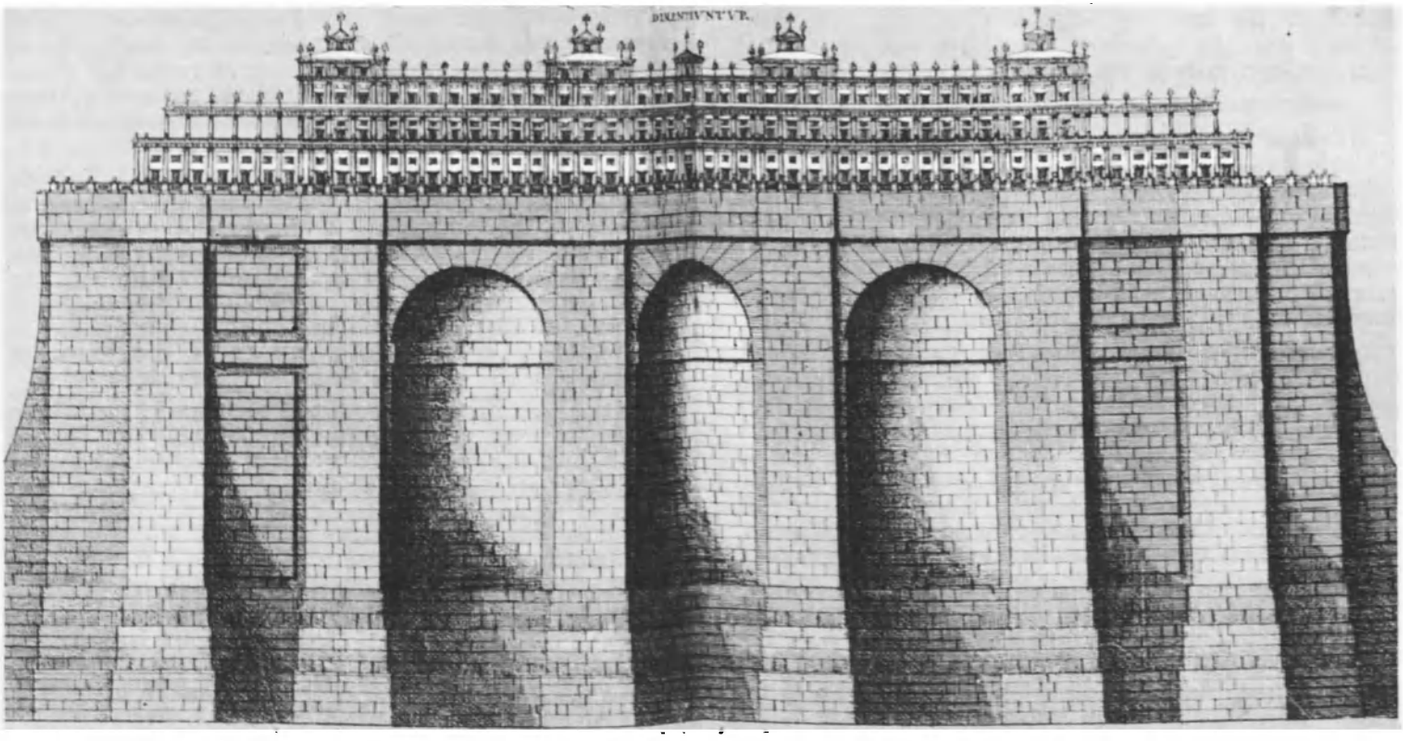


Bibliothèque Nationale, Paris

SOLOMON'S TEMPLE WITH A 17TH CENTURY LOOK

The description of Solomon's Temple in Jerusalem (built about 1,000 years before Christ, but destroyed and reconstructed several times) has come down to us through passages In the Bible (particularly the Book of Kings) from the writings of the historian Flavius Josephus and from the Hebrew texts of the Talmud. Yet when 17th century drawings were made of it on the basis of these texts under the direction of a famed English theologian, Bryan Walton, who was well versed in Hebrew, Latin and Greek, the result was the astonishing building (above) of well-defined mid-17th century appearance, standing on a kind of enormous pedestal (below). Thanks to present-day historical, archaeological and ethnographical knowledge we are now familiar with the things that once existed whereas the 17th century analysts of the ancient texts knew only the meaning of words. Right, a drawing of Solomon's Temple made according to the specifications prepared by two modern archaeologists, W.F. Albright and G. Ernest Wright.

Drawing by C. F. Stevens, "The Biblical Archaeologist", Vol XVIII



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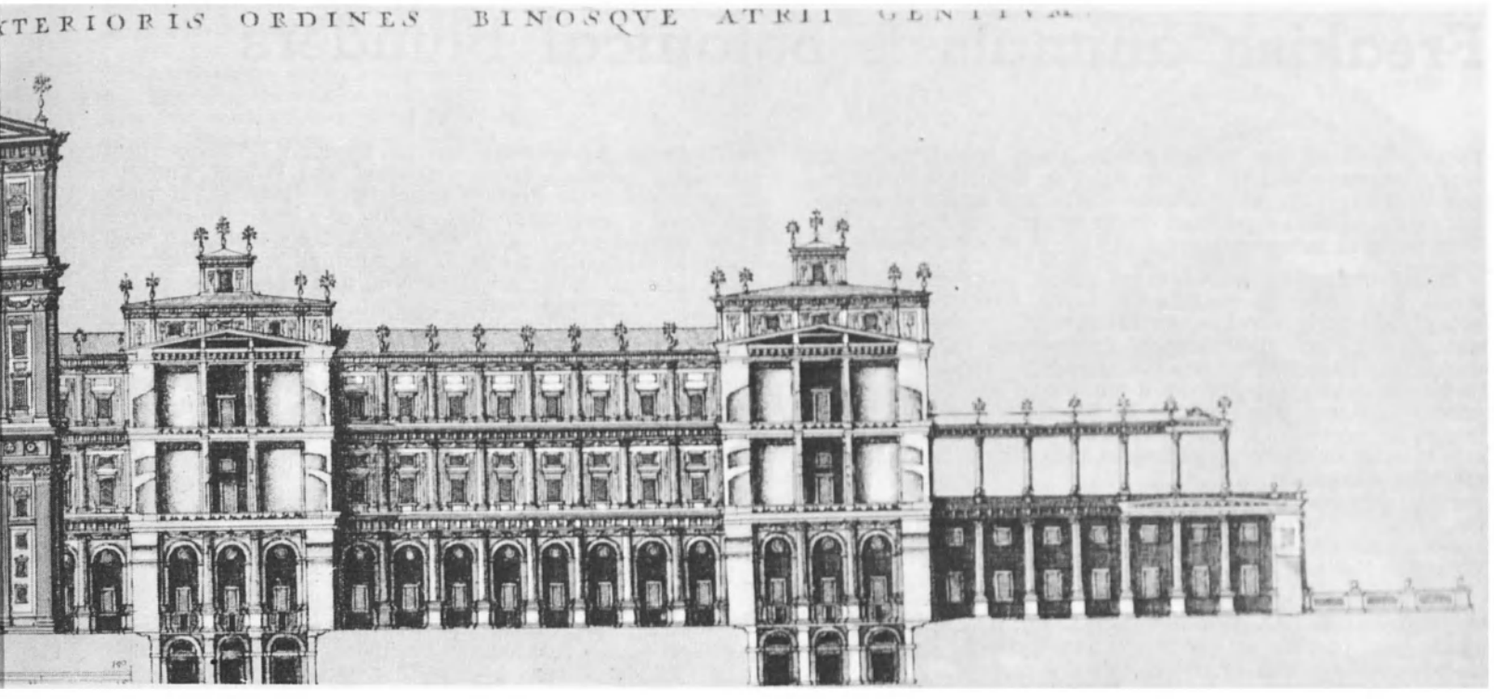

TRANSLATORS, WORDS AND THINGS

by Georges Mounin

Today, when translators are becoming almost as essential a feature in the smooth-running office as stenographers, foreign languages are, generally speaking, learned at school. Since the XVIth century, at least in Europe, this procedure has been so automatic that it has destroyed any notion that languages might be properly learned in any other way. Other methods are looked on as incomplete and suited at best for training amateurs or rough translators; they are accepted in the absence of anything better. The system still regarded as ideal is to learn foreign languages at school. Students may be advised to live abroad for a time but this is treated as an optional addition to help in acquiring a good pronunciation (since nowadays we have records and the radio).

This attitude, linked to the development of school education in modern Europe, has completely transformed our concept of the operation involved in translating. What we learn at school is a foreign *language* so that if we ask what is the essential and adequate requirement for a good translator we are told that he must have as sound a knowledge as possible of the *language* to be translated. Those who know somewhat more about the subject will add that he should have a still better knowledge of the *language* into which he proposes to translate.

This development of the study of languages has resulted in the loss along the way of an old view of translation which was vigorously urged up to the time of the Renaissance: merely knowing the words is not enough in translating, it is also essential to know the things referred to in the text to be translated.

This was the view held by Cicero who contrasted translation of sense with translation of words; it was the view held by the French philologist, Etienne Dolet, who laid down as the prime condition of any good translation a knowledge of the *sense and content of the text;* it is the well-established view held by interpreters who contend that in interpreting Russian statements at a congress on organic chemistry, for example, while it is important to know Russian it is still more important to know about organic chemistry.

This old view shatters the routine conception of translation. It emphasizes, for instance, that "knowing Latin" signifies two quite different things: it means knowing the Latin words and Latin grammar but it also means knowing the realities of Latin life which is very different from our present reality to which those words refer us.

Translation of a text in a foreign language calls for fulfilment not of one but of two conditions. Both are essential and neither is sufficient by itself: a knowledge of the language and a knowledge of the civilization with which the language deals (i.e. the life, the culture, the most complete ethnography of the people who use that language as their means of expression).

It is not enough to study a language in order to be able to translate it well. What is needed is a study—not by way of supplement but as a basic foundation and not haphazardly but systematically—of the culture corresponding to the language concerned. Stays abroad, for example, are not a minor optional addition to the equipment of a good translator; they represent *half of his knowledge.*

The suggestion that linguistic knowledge, however perfect, is not enough to ensure good translation may seem paradoxical—or banal—but it can be verified almost experimentally and in a way which is perhaps itself no less paradoxical.

In 1653, the Cambridge theologian, Bryan Walton, published the *Biblia Sacra Polyglotta* in Hebrew, Chaldean, Greek, Samaritan, Syriac, Arabic, Ethiopian, Persian and Latin. In the first volume was a Latin "Triple

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Freakish animals & botanical blunders

Description" of the Temple of Salomon, based on Holy Writ, Josephus and the Talmud. The author, a Saumur theologian, compared the three texts and analysed each indication of shape, position or dimensions relating to the Temple so as to reconstruct a picture of the building.

This Professor of Hebrew knew almost as much Hebrew, Greek and Latin as we know today and read the texts fairly accurately. Yet when his forty-page commentary was given to the illustrator of the volume (undoubtedly under the direction of Walton himself) an astonishing picture emerged *simply from a reading* of the words comprising his text: the Temple of Solomon, carefully portrayed in accordance with the trilingual text, looks like any English or French building in 1650. Some indefinable element belonging to the period leads one to think of St. Paul's Cathedral in London or the Place des Vosges in Paris.

What had happened? The translators had done a good job of translation, had read the words of the text correctly. The fact that they saw a sort of Louis XIV edifice where we imagine Phoenician or Babylonian architecture is because we know things where they only knew words. No doubt we can read Hebrew a little better than Walton was able to do; but, above all, we know the whole protohistorical archaeology and ethnography of Asia Minor with which they were unacquainted. Bit by bit, we have discovered the things referred to by words which, even though generally well translated, did not enable Bryan Walton to *see* the Temple of Jerusalem.

Vilmorin Collection

Biblical errors. Throughout history translators appear to have stumbled over correct botanical identifications of the more than 150 flowers, fruits, trees, shrubs and herbs mentioned in the Bible. We now know that "the lilies of the field" (Luke 12.27) were in reality anemones (right). When the Prophet Isaiah (35: 1,2) declared "the desert shall rejoice, and blossom as the rose," he was actually alluding (say present-day philologists and botanists) to the Narcissus (above).

The idea of using illustrators of a text to check the element of lingulstic knowledge and the element of ethnographic and/or cultural knowledge needed for translation is justifield by the fact that, in respect of a description, *the illustration is actually a retranslation of the words of the text.* If the illustrator is not directly acquainted with the thing described, then he only translates whatever has been provided by linguistic knowledge; we can thereby measure the contribution made by a cultural knowledge of the things themselves. There are other striking examples of the proof of this measure.

For example, paleontology revealed that there once existed in Patagonia huge edentate creatures like the *Megatherium* which, when standing on its hind legs, was taller than an elephant. For a long time it was believed that these types of giant *Sloth* were fossils. Then a series of discoveries of recent bones, skins and excremential matter together with Araucanian or Patagonian legends referring to the recent existence of a harmless but invulnerable grubbing animal, hairy and of terrifying appearance, led to the suspicion that some species of *Megatherium,* far fom being extinct since the Tertiary period, might possibly have survived almost up to the present time.

A search was accordingly made for references to its existence in the accounts written by early XVIth century travellers. Among those consulted was Father Thévet's *Singularités de la France Antarctique* (1558). This work contained a remarkable description of a creature referred to as a *succarath,* readily and conclusively identified with some sort of giant fossil *Sloth* such as the *Mylodon,* a close relation of the *Megatherium,* and possessing a long tail. When it was being hunted, according to Father Thévet, the animal would carry its young on its back and protect them with its long thick tail.

Since he considered the creature "very strange in appearance", the explorer decided to include a drawing of it in his book and it is this which makes the story interesting from the translator's point of view.

Bernard Heuvelmans, from whom all the present details are taken (1), writes that "the naïve picture accompanying this text shows a sort of very thin lion with a tail like the bushy appendage of an ant-eater and a grotesque head with a certain resemblance to a bearded man. At least four or five little ones are huddled on the creature's back.

"It is more than likely that the drawing was made not by an eye-witness but in accordance with another person's description, as was customary at that period. It is this which explains the frequent distortions in illustrations of animals which none the less seem to be correctly described in the text..."

Here is a striking example of what results from a *translation of words* unaccompanied by *a translation of things.* The illustrator (who had not seen the animal) translated literally what Father Thévet's words, and nothing but those words, meant to him. The difference between his engraving and the reconstruction of the *Megatherium* (carried out by a Twentieth century artist with the help of all our present knowledge in zoology and paleontology) indicates the difference between linguistic knowledge (words without things) and cultural knowledge (words together with the things to which they refer).

This view of translation as a double operation (in which the acquisition of the meaning of certain words *by means of other words* is not enough) indicates the legitimacy of another paradoxical demonstration. Suppose that we were told that the glazed brick dragons (known as *sirrouches*) at the Ishtar Gate in Babylon were very probably some sort of *dinosaur* and not imaginary monsters—"heteroclite compositions of parts taken from four or five different creatures"—we would take this to be simply a journalistic invention.

Yet such is not the case. The famous "scaly quadruped with the front feet of a lion, the hind feet of an eagle, the head of a serpent on a long neck, a forked tongue and on the top of his head. a long horn, various fleshy excrescences and even a short mane like a horse" must be a portrayal of some animal which actually existed.

If the Ishtar Gate had been uncovered in 1802 instead of 1902, says the zoologist Willie Ley, then the Babylonian

(1) "*Sur la piste des bêtes ignorées.*" ("*On the Trail of Unknown Animals.*") *Vol.* 11, *pp.* 3-53, *Paris, Plon,* 1955.

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COUSINS OF THE SLOTH

The succarath, the strange animal shown on right, was described in great detail by a 16th century French priest, Father Thévet, when he wrote one of the first books about the natural history of North America. Whereas a drawing made at that time on the basis of Father Thévet's description produced the freakish animal depicted here, modern zoology has conclusively identified the succarath with some sort of giant sloth such as the Mylodon, perhaps now extinct (drawing, below), whose present-day relative is the three-toed sloth (shown in photo below with its offspring).

Taken from "Sur la Piste des Bêtes Ignorés"

© Jean-Marie Baufle

This sirrouch (right), adorns the Ishtar Gate, built in Babylon more than 3,000 years ago. This monster depicted in low relief alternates with figures of bulls. It is now believed that the artists of the Ishtar Gate reconstructed the sirrouch from descriptions of a rare African reptile —a kind of Iguanadon or Ceratosaurus whose existence is still affirmed today in the Congo Basin—brought back to Babylon by travellers who had actually seen it. By a series of linguistic "translations" followed by pictorial "translations", a species of Ceratosaurus (below) became the Babylonian dragon, a beast of mythological aspect.

From "Sur la Piste des Bêtes Ignorées"

Babylon's dragon was a real African reptile

dragon would have been taken for a mythological animal; but, during the XIXth century, the great fossil family of dinosaurs was discovered, including one particular group, the *Ornithopoda,* which has the hind feet of a bird like the Ishtar dragon. As early as 1918, the archaeologist, Koldewey, recognized that if a creature resembling this dragon were to be met with in nature, its place would be in the order of Dinosaurs—and that the Iguanadon of the Belgian Cretaceous period would be its closest relative.

Koldewey went no further than that but Willie Ley has found the most plausible explanation so far of the presence of this sort of *Iguanadon* or *Ceratosaurus* on the walls of Babylon: we may be dealing with a monster, reaching a length of some 36 feet, whose existence is still affirmed to this day throughout the Congo basin.

HERE again, Heuvelmans has scrupulously supplied the quasi-experimental "translation" operations whereby a rare African reptile became the Babylonian *sirrouch:* the artists of the Ishtar Gate reconstructed the dragon in accordance with accounts given by travellers who had seen it (Babylonian travels to the centre of Africa are a well-attested fact). It was a *linguistic* description which provided the model and supplied the basis for the stylization which resulted in the monster:

"If you doubt the validity of this", says Heuvelmans, "I suggest the following experiment. Ask someone who has never seen a reconstruction of a dinosaur—a child, for instance—to draw an animal in accordance with the foregoing sketch of the Congolese 'dragon'. There is a strong probability that this person will draw a creature with a remarkable resemblance to the *sirrouch* of the Ishtar Gate.

"He will first draw a quadruped with the shape of some familiar animal (a horse, a dog, a bull or a cat), and will then, following your indications, add a long tail and the head and neck of a snake. When you mention the clawed feet, he will undoubtedly draw the feet of a lion or a cat. Then he will place on the creature's head the various features which you specify: the small horn and the crest of tentacles. Finally when you make it clear that the creature is a reptile, he will cover the body with scales. Except for the hind feet, this will result in a very acceptable *sirrouch.*"

Bernard Heuvelmans' analysis shows us how, through a series of linguistic "translations" followed by a series of pictorial "translations", a species of *Ceratosaurus* became the Babylonian dragon. When we follow the same series in the opposite direction, we can fairly consider the Babylonian creature as presumptive evidence for the existence of the African *Ceratosaurus.*

These curious linguistic "experiments" may seem far removed from the concern of translators but they illustrate, experimentally, the very ancient idea (and, in its scientific form, the very new idea) that words do not take the place of things like synthetic rubber replacing natural rubber. Linguistic signs do not wholly replace the things they designate, they refer us to those things. Speaker and listener, or author and reader, must jointly carry out this journey from thing to sign and from sign to thing if they are to understand each other.

AT its most difficult, the whole work of the translator consists precisely of trying to give his readers some idea of the inaccessible things discussed in a text written in a foreign language and alluding to a culture which is often also foreign, either in part or in whole. To give people in the Tropics an idea of winter and snow; to explain the parable of the Good Sower to inhabitants of the New Mexico deserts who plant and watch over their seeds one by one; or even to convey to French readers that the Federal Trade Commission or the Interstate Commerce Commission in the United States have nothing in common with any ministerial or parliamentary trade commission in France: these are tasks as skilled and as difficult as discovering the *Megatherium* which is undoubtedly hidden behind Father Thévet's *Succarath* or the *Ceratosaurus* which is probably concealed by the *sirrouch* of the Ishtar Gate.

The translator must not be satisfied with merely being a good linguist, he must also be an excellent anthropologist; and this amounts to saying that he must not only know all about the language he is translating but also all about the people who use that language. And he thereupon becomes a prestidigitator, a magician, the high priest of an *eighth art.*

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STUDENTS ABROAD IN SEARCH OF KNOWLEDGE

by Gordon Behrens

Since ancient times, students have been on the move in search of knowledge. In the sixth century B.C., oriental scholars flocked to the Kingdom of Lu to listen to the scholarly lectures of Confucius. The court of the Indian king, Vikramiditya II, in the golden age of Sanskrit literature drew scholars from as far away as China and the Near East. The famous Academy in Athens where Plato taught and the school of Aristotle drew students from three continents to these ancient centres of learning.

Europe's medieval universities like Cracow, Prague and Paris were magnets which brought students from every corner of Europe. In the 14th century, the forty colleges of the University of Paris attracted students from every country in Europe.

The trek of students from one country to another to further their academic ambitions is as old as history, but until fairly recent times such study abroad was motivated primarily by a student's desire to find the best schools of higher learning and the best teachers available in his field. Needless to say, he paid for it out of his own pocket.

Within the last few decades, the whole concept of study abroad has been revolutionized. Governments, intergovernmental organizations, private agencies and international organizations have recognized that the exchange of students is one of the positive ways to promote better understanding between countries and to help break down those prejudices and misconceptions which distance, language, race and customs may create between peoples.

More recently, the exchange of students has been viewed as an important way in which developing countries, lacking trained personnel, can educate and train their young people in skills and knowledge acquired abroad, thus permitting them to make a greater contribution to the economic and social growth of their own countries.

Transportation and cost have always been the prohibiting factors in the free flow of students from one country to another. In this age of the jet aeroplane, getting there is easily solved, but paying for it amounts today to a four-figure sum that only a handful of students can afford. The medical student from Thailand who wishes to continue his work in a specialized field in Vienna, or the Bolivian engineering student who wants to study hydraulics in the United States, has to spend practically a year's tuition and living costs in transportation before he ever sets foot on the campus of his choice.

Realizing the benefits of student exchanges as well as the prohibitive costs involved, more and more governments and other organizations, both private and international, have awarded fellowships, scholarships, grants and other forms of financial aid to enable deserving students to travel and study abroad. A Unesco survey estimates that there were, in 1960, a total of 200,000 students studying in countries other than their own. Of this number almost one-half were being helped by awards from a vast variety of government, private and international sources.

Unesco has, from its inception, taken a great interest in the programme of the exchange of persons throughout the world. In 1947 the Exchange of Persons service was established and one of its first tasks was to catalogue the great number of fellowships, scholarships and other

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OVER 200,000 STUDENTS were at work in countries other than their own during 1960 according to a Unesco survey. Nowadays, to Great Britain alone nearly 30,000 students come from Commonwealth countries. Here, students from South Africa, Kenya, Ghana and Uganda study architectural photography.

Official Soviet photo

British Council, London

NEED OF KNOWLEDGE AND SKILLS in developing countries which lack specialized personnel is seen in increasing flow of young people to countries with large-scale technical and educational resources. Above, with a Kremlin tower as a backdrop, Asian and African students chat during a sightseeing tour of Moscow. Right, couriers of the British Council meet newly arrived students at a London railway station and help them on their way to university, technical centre or school.

STUDENTS ABROAD *(Cont'd)*

115,000 study awards in 113 countries

awards available throughout the world for students who wish to study abroad.

This job had never been done before on an international scale. In 1949 UNESCO produced Volume I of *Study Abroad*, listing 15,000 awards for students to study abroad made by 281 agencies in 34 countries. Today in its 13th edition, "Study Abroad" lists more than 115,000 awards available from 1,652 agencies, institutions and governments in 113 states and territories.

Study Abroad has now become one of UNESCO's biggest "best sellers". It is now looked upon as a veritable bible of fellowship information by students, educators and scientists, as well as government and private agencies. "Dog-eared" copies are consulted by scores of students throughout the world in the offices of government educational counsellors, university libraries and a host of private and public organizations which help students who are looking for opportunities to continue their academic work in foreign countries.

THE latest volume covering the academic year 1962 shows that awards available for study in foreign lands are most numerous in the fields of applied science, social sciences (including education), natural sciences, mathematics and humanities. But this general breakdown does not begin to probe the scope and breadth and unusual character of many awards waiting to be claimed by some deserving student.

Ten young star-gazers, for example, can continue their work in astronomy for a three-to six-month period in a country where the telescopes are more powerful than at home through a travel grant offered by the International Astronomical Union. The Associated Country Women of the World provide an all-expense one-year study abroad for a young woman interested in studying practical nutrition, adult education, home and country crafts, or family welfare. The International Union of Students picks 25 students each year for three to six-year courses in a University of the U.S.S.R. in the fields of science, medicine and agronomy. All expenses are paid and an additional grant is available for students from tropical lands to buy warm clothing.

Over four per cent of all awards offered for study abroad in the latest UNESCO edition are for fellowships, scholarships and other grants-in-aid made by the United Nations and its family of specialized agencies (including UNESCO). Future atomic scientists, bankers-to-be and budding economists are among the recipients of the UN's annual legacy for study abroad. Farmers, fishermen, meteorologists, aviation mechanics and labour relations experts can also find programmes listed for foreign study by the U.N.'s specialized agencies.

UNESCO's own programme for study abroad lists more than a dozen fields ranging from education to natural and social sciences, cultural activities, information media, petroleum research and the training of journalists.

One of UNESCO's newest exchange programmes is for women adult education workers, to provide a travel grant to enable women active in their own countries in women's organizations to travel abroad and see what is being done in other countries by similar organizations. During the current year, twenty women sponsored by international women's groups holding consulting status with UNESCO will benefit from this UNESCO travel grant. A woman from Fiji will visit New Zealand, a Japanese women's leader will visit the United States and four Scandinavian countries, another from Kenya will be visiting the U.K., and a Northern Rhodesian, Australia. A Nepalese will go to Sierra Leone and two women from Argentina and Peru will visit three European countries.

Although international organizations account for an ever-growing number of awards and opportunities for foreign study (14%) individual governments still account for almost fifty per cent of the scholarships and fellowships and other grants offered to students in UNESCO's latest edition of *Study Abroad*. Educational groups account for about 20 per cent of the awards with foundations, clubs, private groups, etc., making up the balance.

Most awards listed in the UNESCO annual are unrestrictive as to eligibility, that is, who can participate. About a third of the awards, however, stipulate that a student receiving the grant be a resident or citizen of one parti-

cular region or country. Another two-thirds stipulate that the award is for study in a specific country or institution of higher learning.

Some awards specify the precise field in which the exchange student must study, but a fair number (about one quarter) let the student choose his own field of interest. In those awards which do specifically define the field of study, applied sciences lead the field with about 20 per cent, social sciences 14 per cent, mathematics 10 per cent with liberal arts, humanities, philology, art, culture, history, librarianship, museology, etc., accounting for the rest.

Thousands of fellowships are offered to students of particular ethnic origin, countries, regions or continents. One small college in the midwestern United States, for example, offers six scholarships every year—two to Latin Americans, two to Africans and two to Asians. A university in Iceland offers a scholarship to a student from the U.S.A. of Icelandic background and one to a Norwegian, while a university in Norway offers, through its students' organization, a year's scholarship to a student from the U.S.S.R.

NEEDS of the African students in the newly independent countries who keenly desire to continue their studies in foreign countries, have received immediate recognition from many countries and awarding agencies. In a special supplement to *Study Abroad* published only a few months ago. UNESCO lists 10,000 opportunities for foreign study available to African students made by 136 agencies in 54 countries. Awards are open to students from 35 African states and territories. The demand for this document entitled *Fellowships for Africans* has been so great that it has already gone through a second printing.

In addition to numerous awards from international organizations, countries like the U.S.A., the U.S.S.R., the United Kingdom, France and Belgium, list hundreds of scholarships available for undergraduate students to study in the universities of their respective countries in any field of their choice.

Private agencies offer interesting and unusual opportunities in a variety of fields. The British Red Cross Society grants two Florence Nightingale scholarships to nurses from Commonwealth countries in Africa. Nine young musicians chosen from Ghana, Kenya and the Federation of Rhodesia and Nyasaland can receive scholarships to music academies in Great Britain sponsored by the Associated Board of the Royal Schools of Music, and some aspiring student of cinematography from the Republic of Somalia can receive a 20-month course in Rome at the expense of the Italian Government. A considerable number of scholarships are offered by African countries themselves for students from neighbouring countries.

In connexion with *Study Abroad,* UNESCO has undertaken nine separate annual surveys of students studying in countries other than their own. The surveys have included not only scholarship and fellowship students but also those who are studying on their own. The results of the surveys are startling. They show that almost two per cent of all the world's students in higher education are taking their studies abroad. The total figure is 200,000 and this number is viewed as even more significant in the light of the fact that a high proportion of these students will probably occupy positions of great importance in the economic, political and social development of their own countries.

About 50,000 of the world's students studying abroad are enrolled in institutions of higher learning in the United States, although the percentage of foreign students in the U.S.A. in relation to the total number of students in higher education is below the world average. The Federal Republic of Germany, France, the United Kingdom and the U.S.S.R. each have more than 10,000 foreign students enrolled in their colleges and universities. Argentina has almost that number with a total of 9,269 students from abroad. Japan counts almost 4,500 students from abroad and in Switzerland and Austria where foreign students are fewer in number, they still make up approximately one-third of the total number enrolled in universities and colleges.

As might be expected, geographical nearness and political affinity show up in the distribution of foreign students from one country to another. In a study of 18 coun-

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An adventure in learning

tries, UNESCO found that in 12, more than half of the students came from only three or four foreign countries.

The study showed, for example, that in Japan, 59 per cent of the foreign students were from Korea and 25 per cent from China. The United Kingdom counts 19 per cent from its non-self-governing territories, 12 per cent from India, 9 per cent from U.S.A., and 8 per cent from Nigeria. Switzerland has 20 per cent of its foreign students from Germany (1), 13 per cent from the U.S.A. and 9 per cent from France.

In some countries and territories the percentage of foreign students is almost on a par with the country's own student enrollment. Trinidad and Tobago, for instance, have 66 foreign students and only 77 native enrolled students—a staggering 85 per cent of foreign students as compared with the U.S.S.R. which has about 0.5 per cent of its student population from abroad, and the U.S.A. with 1.4 per cent.

The UNESCO survey shows that more than a quarter of foreign students studying outside their own countries are following courses in the humanities, education and fine arts. Not quite another quarter are taking courses in engineering. Law and social sciences occupy about 17 per cent and natural sciences a little more than 10 per cent. Medicine, formerly one of the most popular reasons for study abroad, now accounts for about 15 per cent of the total foreign student population.

THIS survey made by UNESCO helps to provide agencies and governments with a clear idea of what sort of scholarships are needed and what they can best offer to achieve effective results for the money they provide. Here can be found, both in the documentation of awards available for study abroad and the survey of students presently studying abroad which UNESCO has compiled, the clue to problems which exist in this field in its modern forms.

UNESCO has summed it up like this:

"Study abroad is widely recognized as having many valuable uses. It can give the individual student the diploma or the experience he needs. It can influence the international development of the specialized field in which he is studying. It can further the aims of the organization giving the scholarship which enables him to study abroad. It can train personnel for employment in projects for social and economic development. It can spread the knowledge of certain languages and cultures in other countries. It can be one of the most effective ways of breaking down individual prejudices against people in other lands, thereby encouraging a better understanding among the nations between which exchanges are made.

"Study abroad can be an adventure in learning but it can also be an adventure which puts a strain upon the student. Strange methods of instruction and living conditions can affect his power to learn. Other things may test his power of adaptation" (2).

UNESCO seeks solutions to these problems through the information which it is constantly collecting from the donors of awards to students for study abroad and from the surveys made of students in foreign lands. It is undoubtedly true that the student abroad faces problems and challenges which his colleague at home escapes, but what he faces in effect, are those problems and challenges which face all persons going abroad to learn something of other men's ways.

(1) *Figure includes both students from Federal Republic of Germany and Eastern Germany.*

(2) *"Other Men's Ways", Unesco and Its Programme XIII.. Unesco* 1955, *Paris.*

Svenska Lantarbetareforbundet, Stockholm

USIS

Courtesy, University of Washington

OTHER MEN'S SKILLS & WAYS

Seen here are three examples of the vast scope and breadth of ways in which people are nowadays taking advantage of opportunities to go abroad to develop skills and talents or simply to see how their own jobs are done in other lands. Top, Austrian farm-workers spending a day on a Swedish farm at Hornsjofors are one of many such groups, representing many trades and occupations, which each year exchange visits from one end of Europe to the other. Centre, a girl violinist from the United States practices under the supervision of a teacher at the Paris Conservatoire de Musique. Bottom, a Philippine student (foreground) prepares for his Master of Science degree at the Fisheries School of the University of Washington, in the northwest of the U.S.A.

Letters to the Editor

USE WORLD'S SURPLUS FOOD

Sir,

Much has been said and written about the problem of food and people. Surplus food does not reach countries where it is needed mainly for political and economic reasons. The Food and Agriculture Organization of the United Nations could play a great part in breaking this deadlock by creating a branch whose job would be to buy up surplus food and distribute it where most needed. It should request food exporting countries to contribute a certain percentage of their production at a fixed rate to the "pool". But the distribution of this food should not be free unless circumstances demanded it.

M. E. Mahath
Egersund, Norway

HOMAGE TO TAGORE

Sir,

Your articles on Rabindranath Tagore (December 1961) enlightened and educated me about a man of whose life and work and background I knew so little. The world, and I mean all the world—including its politicians—could benefit from his teachings.

When will the world produce another Tagore to awaken the minds of present-day men and relieve them of the scourge which hovers over us at present?

M. Q. Schmidt
London, England

Sir,

I have been waiting for you to devote one issue to "Tagore and his mission", as the world has just celebrated his Centenary. But in my view you have not done justice to such a great saint, not only of India but of the whole world—who has also contributed much towards world peace. Apart from this there are many other subjects of Asian countries which should find place in your magazine.

B. P. Desai
Dar-es-Salaam, Tanganyika

BURDEN OF ARMAMENTS

Sir,

UNESCO must not confine itself to problems of education science and culture in isolation from the struggle to maintain peace and prevent war. At the present moment UNESCO must do everything possible to lessen the tension existing in the world. This can best be done through the publication in THE UNESCO COURIER of articles by statesmen, scientists and plain people from all parts of the world who desire to maintain peace and live without the constant threat of war. The most effective method of preserving peace is the complete disarmament of all nations, something that all people in all countries agree with.

You should publish a number of articles devoted to a demonstration of the material values that mankind could acquire by releasing the gigantic resources now being wasted on armaments, of the wonderful projects for the transformation of the face of our planet which could be put into effect for the benefit of all mankind and for the improvement of living standards of all peoples.

It is interesting to peruse an entire issue devoted to Velasquez or the preservation of the monuments of ancient Egypt, but the problem of the struggle for peace must also find its place in your columns, for there may occur a terrible catastrophe from which there will be no recovery, and then there will be no Velasquez pictures and no one to see and enjoy them.

Lev Naimushin
Irkutsk, U.S.S.R.

ANTARCTIC EXPLORERS, FATHER & SON

Sir,

I should like to point out that the photograph of Commander Adrien de Gerlache (published in the portrait gallery "Trail Blazers of Antarctica", January issue) was, in fact a photograph of me (his son). The mistake no doubt arose from the fact that I also led a Belgian expedition to the Antarctic, but in 1957, not 1897. My account of the expedition was published under the title, *Retour dans l'Antarctic* (Return to the Antarctic) and included photographs of us both. There is a certain resemblance between us, but not enough for one of us to be mistaken for the other. I must say I was surprised to find myself in the company of Capt. James Cook and Jules Dumont d'Urville.

Gaston de Gerlache
Mullem par Huise, Belgium

Ed note: We regret this error and publish above photographs of the de Gerlaches, father (left) and son.

BIBLIOGRAPHIES, PLEASE

Sir,

I read THE UNESCO COURIER correspondence column with much interest and welcome any friendly controversy it may raise. Nothing has raised so much controversy as reader efforts to improve the Editor's choice! Now I should like to add my coal to the fire.

As a Geography specialist I quite naturally favour scientific geographical articles of advanced text. However, as I am resigned to the fact that these and similar articles are rather rare, I make the following appeal.

All articles, irrespective of subject matter, should include a comprehensive and authoritative bibliography as a guide to more advanced study. In this way the "general treatment" of subject is preserved yet the specialist is succoured.

Michael P. Robinson
Egremont, England

Sir,

Your remarkable issues on racism and the temples of Abu Simbel (1960) pursuaded me to renew my subscription. In the issues of the past year I found nothing of interest to compare with these. With the exception of your issues on Africa and Art in the Life of Man, I was disappointed by what I read, and consider that at the present time there are subjects far more vital to friendship and understanding between peoples than the ones you chose.

Philippe Suret
Mont-Saint-Aignan, France

DIVORCED FROM REALITIES

Sir,

The September 1961 issue of THE UNESCO COURIER (Africa's Wild Life in Peril) was such a shock in its fantastic divorcement from the realities of life at the time, so remote from the crucial problems confronting the people of the world, that we could only throw our hands up in bewildered disgust. But we are somewhat appeased that you put in the brilliant and appropriate cartoons of Cram (Marc Aleu). The fact that he comes from Spain, of all places, intensifies the pleasure.

The Siegel family
Los Angeles, U.S.A.

ONE THEME ISSUES

Sir,

There have been so many editions over the past two years which have no interest for me because of the deplorable practice of devoting whole issues to one topic. Your journal is supposed to cater for those interested in the arts, in science, in education. Why therefore devote whole issues to one of these? A sensible journal would contain variety.

R. R. Millman
Weston-super-Mare, England

Ed. note: *We hope that a majority of readers will find our new editorial policy of publishing a greater variety of articles to their taste.*

From the Unesco Newsroom...

'PASSBOOK' FOR EXHIBITS: The Customs Co-operation Council in Brussels (28 member nations) in consultation with GATT (General Agreement on Tariffs and Trade) and UNESCO, has created a special passbook or "carnet" which allows equipment and goods for display purposes or equipment needed for radio, TV and film production to enter a foreign country on a temporary basis. Duties on the goods are assessed, but are not payable providing the goods return to their country of origin after a specified time.

COMPUTER SERVICE AVAILABLE: The newly established International Computation Centre in Rome will be able to offer computer services to its member states and to U.N. agencies this year. This was stated at the recent first General Assembly of the Centre at Unesco House, in Paris, when approval was given to the 1962 programme which includes research into such problems as the unifying of "languages" used by computers and the awarding of fellowships to train specialists.

ART SLIDES OF RUSSIAN ICONS: The 11th and latest series of UNESCO Art Slides in colour present a collection of works representing the essential aspects of the Russian icon from the 12th to the 16th century. These colour slides aim to bring within reach of a wide public reproductions of important but still little-known world art masterpieces. With each set comes an explanatory booklet in English, French and Spanish. Prices vary from country to country, but do not exceed the equivalent of $10 in local currency.

CENTRE FOR ASIA'S EDUCATORS: A regional centre for training educational planners and administrators—a Unesco-aided project—will open in New Delhi, India later this year. Preparatory to its creation, representatives of Asian states have recently been meeting in New Delhi on UNESCO's invitation to study Asia's most urgent educational problems and to prepare programmes and curricula for the centre. Surveys made in 15 Asian countries showed that nearly 90 million school-age children are still without classes.

AGAINST DISCRIMINATION IN EDUCATION: The Convention Against Discrimination in Education adopted in December 1960 by delegates of UNESCO's Member States will come into force on May 22, three months after its acceptance by the Central African Republic—the third member state, after France and Israel, to accept or ratify the convention. It implements the Universal Declaration of Human Rights which asserts the principle of non-discrimination and the right of every person to education.

STEEL SMELTING BY REMOTE CONTROL: During a recent experiment made by the Ukrainian Academy of Sciences, the smelting of steel at the Dnieprodzerzhinsk Steel Works was controlled from a computing centre in Kiev, 300 miles away. The computer received signals as soon as the smelting began and its pre-set programme enabled it to collect and analyse information as the operation developed until, at the moment the steel was ready for pouring, it gave the necessary command.

LONG-RANGE MIGRANTS: Australian scientists in Canberra recently received 40 banded birds from Chile in South America where they had flow from Macquerie Island in the Antarctic—a distance of almost 6,000 miles. Since 1953, when the Commonwealth Scientific and Industrial Research Organization began to gather information on the movement and migration of birds, nearly 200,000 birds of more than 260 species have been banded in an area ranging from New Guinea to Antarctica.

MINERAL GEMS ON VIEW: A giant jewel box containing specimens of over 70 per cent of the world's known minerals is to be built this year at the Royal Ontario Museum in the University of Toronto, Canada. The collection will include gems, gold nuggets, crystal clusters and brilliantly coloured minerals which will be enhanced by dramatic lighting effects, contrasted against a darkened gallery.

UPPSALA PHYSICS SEMINAR: The University of Uppsala, Sweden, is organizing an International Seminar for Research and Education in Physics this year. Co-sponsored by the International Atomic Energy Agency, UNESCO and the Central Committee for Swedish Technical Assistance, it is open to non-European students and scientists, mainly from the developing countries, who will be able to take part in experimental research work in a field of physics and learn about the organization of research projects, physical laboratories and the teaching of graduate and undergraduate students. Applications for attending the course (Sept. 1962-July 1963) should be sent to International Seminar, Institute of Physics, University of Uppsala, Sweden, and should arrive not later than April 15, 1962.

'HIGH DAM OVER NUBIA': The far-reaching effects of the building of the Aswan Dam and the new High Dam are dealt with in "High Dam Over Nubia" by Leslie Greener, just published in New York. In addition to reviewing the archaeological and historical losses, the author describes the efforts now being made to preserve as much as possible of the area, including UNESCO's campaign to save the temples of Abu Simbel and Philae, among other archaeological treasures.

ELECTRONIC ZOO TOURS: By inserting a key into a small box, young visitors to the Bronx Zoo in New York can listen to a short talk about some of the animals there. There are 40 "talkie" boxes at various points around the Zoo, each containing a tape-recorded talk by a member of the staff giving anecdotes, information and general zoological background facts about the different animals.

UNESCO-MINDED JAPAN: A photographic exhibition prepared in Japan by the Japanese National Commission for UNESCO illustrates the interest in UNESCO's activities aroused among all sections of the community. The photographs show work being done all over the country—in schools, UNESCO Clubs, and during cultural and educational events—to make known the aims of UNESCO, of which Japan became a member ten years ago.

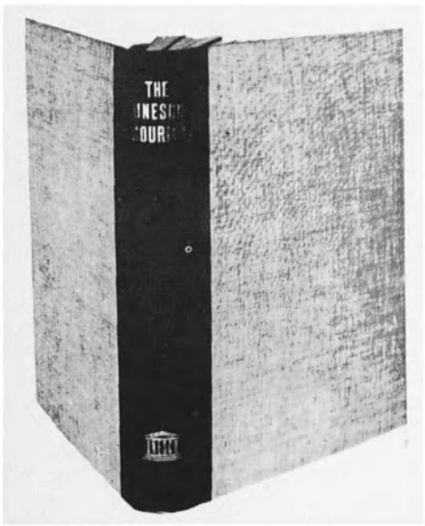
ELECTRICITY FROM THE SEA: Soviet engineers plan to produce electricity by using the action of tides in the Barents Sea. The power station they plan to build will be an experimental one with a capacity of 1,200 kws, located at Kisleguba, northwest of Murmansk. Tide levels in the Barents Sea can have differences of up to 35 ft. In slack periods turbines will be kept working by water from a reservoir.

UNESCO PHILATELIC SERVICE

Shown here are the first commemorative stamps issued in 1962 by the U.N. Postal Administration. Above, stamp printed in 4c and 7c. denominations to honour U.N. activity in the field of housing and urban development and issued on February 28. Below, " The World Against Malaria ", a stamp honouring the World Health Organization and its drive to eradicate malaria in countries where it threatens over 1,000 million people, issued on March 31 in 4c. and 11c. denominations As the agent in France of the U.N. Postal Administration Unesco's Philatelic Service stocks all the U.N. stamps and first-day covers currently on sale as well as others issued by many Unesco Member States to commemorate important events in the history of Unesco and the U.N. For prices and further details write The Unesco Philatelic Service, Place de Fontenoy, Paris 7e.

Imp. GEORGES LANG, PARIS-IMPRIMÉ EN FRANCE

Binders for your collection of THE UNESCO COURIER



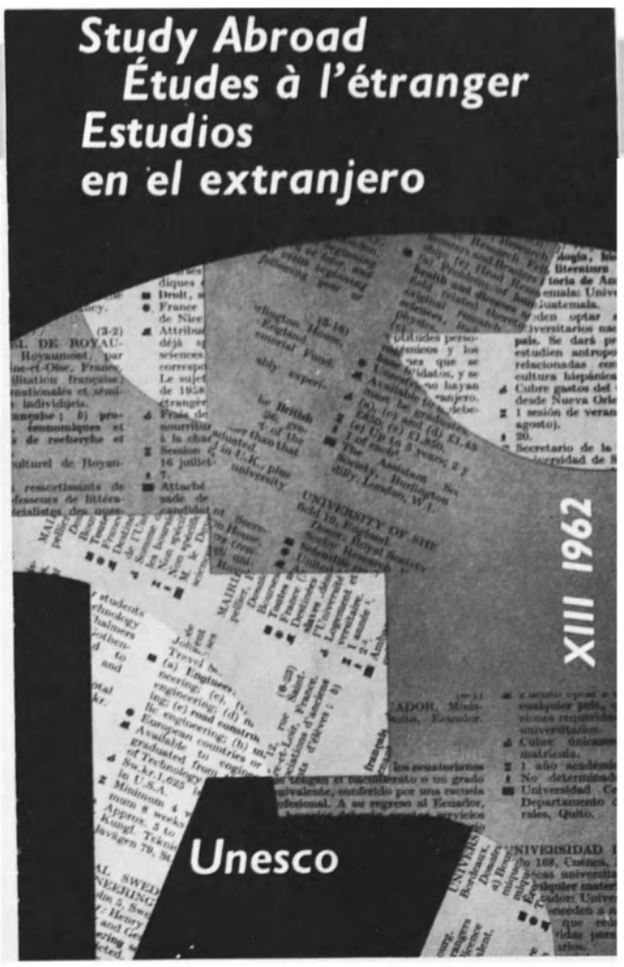
We offer subscribers a special binder for their copies of THE UNESCO COURIER holding a year's issues of the magazine. Handsomely produced in halfcloth with the spine in an attractive blue and the title (in English, French or Spanish according to the edition to which you subscribe) and Unesco colophon embossed in gold, these convenient and attractive binders, costing $2.50; 12/6 stg.; or 6 NF, can be ordered from UNESCO Agents.

Courses, Study Tours, Work Camps

Vol. XIV, 1962

JUST PUBLISHED

Do you want to plan your vacations to the best advantage? Do you want to make friends of our own age in foreign countries? Do you want to know about all the opportunities that are open to you? If so, you will be interested in the latest volume of VACATIONS ABROAD. It will give you information on over 1,500 educational and cultural vacation activities open to young people, students, teachers and workers wishing to combine their holidays abroad with educational travel. Over 860 institutions have contributed information on vacation activities in 1962 in approximately 75 countries. Price: $ 1.25.



Just Published:

NEW 1962 EDITION

Last year more than 200,000 students enrolled for higher education in countries other than their own. This fact alone shows the usefulness of this most popular Unesco handbook. Volume XIII just published, brings you the latest information on 115,000 fellowships offered by governments, universities, foundations and other institutions in over 100 countries and territories. A perfected system of classification will help you to find rapidly all the details: who is entitled to a scholarship, course of study, amount of award, and where to apply. An invaluable manual for anyone contemplating study in a foreign country. An indispensable reference book for all libraries, universities and information centres. A useful instrument in promoting educational contacts throughout the world. (See article page 28.)

$3.00 15/-(stg.) 10.50 NF

A BOY SPEAKS FOR ALL BLIND PEOPLE

This statuette, entitled "I Want Eyes", is the work of a blind Japanese boy, Shigeru Uchikawa. Though only eight years old, Shigeru has expressed with dramatic intensity his hope to see the world one day, despite the failure of one operation to restore his sight. He is a pupil of Shiro Fukurai (left) a sculptor-teacher at the municipal school for the blind at Kobe, Japan, who helps his pupils to have confidence and pursue a purpose through art. Of some 650,000 blind children in the world, only about 40,000 are in school. Over two-thirds of the world's 10 million blind could have preserved their sight had they benefited in time from modern preventative medicine and surgery. The theme for this year's World Health Day on April 7 is "Preserve Sight".

Photos Akgawa